COÖPERATION AND COMPETITION

AN EXPERIMENTAL STUDY IN MOTIVATION

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BY

JULIUS BERNARD MALLER

L. C.

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN THE FACULTY OF PHILOSOPHY, COLUMBIA UNIVERSITY

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J. B. M.

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COÖPERATION AND COMPETITION

CHAPTER I

INTRODUCTION

Degrees of Motivation

From the aspect of behavior, motives differ from one another in a quantitative manner, that is, in the efficiency of performance which they produce. The intensity of a motive can therefore be determined by measuring its product, the speed and quality of the performance.

That all voluntary activity is, to some extent, motivated, is self-evident. To talk of absolutely unmotivated work is to admit response without stimulus or effect without cause. An objective study in motivation would therefore not attempt to distinguish motivated from unmotivated work, but aim at the characteristics inherent in different forms and degrees of motivation brought about by different incentives.[1]

Personal and Social Motivation

Two forms of motivation were chosen for investigation: self-motivation appealing to the desire for personal gain, and group-motivation appealing to the desire for group gain. The former involves only the interests of the individual in action, while the latter involves, in addition, the interests of the group of which the individual is a member.

From the point of view of the reacting individual the two motives do not differ qualitatively. Nursing the young on the part of a mother is as "personal" an urge to her as seeking food when hungry. The difference between individuals in the relative intensity of their responses to personal and social needs, from that point of view, is a quantitative one, i.e., a difference in the prepotency of one native tendency over another.

[1] The incentive may be either an expected reward or an avoided punishment. The term incentive refers to the external stimulus offered; the term motive to the readiness to respond. As the main object of the study was to measure individual differences in *response*, the term motive rather than incentive will be used throughout this book.

From the social point of view there is also a qualitative difference between the two motives. A tendency to respond more readily to personal needs in disregard of others is considered undesirable, egotistic; a tendency to respond more readily to the needs of others—highly desirable, altruistic. It is obviously of great social value to know the relative intensity of various motives resulting in respective degrees of "efficiency." It is of vast educational consequence to know which of two motives when used will stimulate the child to do his utmost. Such knowledge would further higher productivity per unit of time as well as the cultivation of efficiency as a habit.

Measurement of Motivation

The intensity of a motive can be determined by measuring the magnitude of the resulting activity. Just as any physical force, so the force of a stimulus can be measured, by the amount of the consequent work done at a given degree of difficulty, or resistance. $\left(\text{Force} = \frac{\text{Work}}{\text{Distance}}\right)$

Competition and Coöperation

The situations chosen for investigation were those of competition and coöperation. These are two aspects of self-others relationship which involve motivated activity. It was the aim of this research to compare these motives from two angles:

A. The intensity of response evoked by each motive acting independent of the other.
B. The resulting act when the two are thrown into conflict.

Illustration. The specific meaning of competition and cooperation and their comparison as used in this investigation will be clarified by an illustration. Let us compare the speed of a child racing with a friend for a prize to be awarded to the faster runner, with the speed of the same child running as a member of a team in which his identity is practically lost but in which, nevertheless, his speed influences the success of his team. Now, excluding the difference in "feeling" in the two situations and the different concomitants that may accompany one situation and not the other, the relative strength of the two motives can be determined. The record of the speed of running, period of running without rest, obstacles overcome during the run, etc.,

would be required. The comparison between the two motives could then be expressed quantitatively.

The intensity of the team motive in the illustration above could, in a sense, be measured by the child's actual speed of running during a given game. This measure, however, would be meaningless because the tremendous differences between individuals in speed as well as in the general readiness to run would make it impossible to tell how closely they attained their capacity. As capacities for speed differ the amount of work done would differ from individual to individual. It would be necessary to have a point of reference to be used as a basis of comparison.

If the child's speed of running just for practice were known, it could be used as such a point of reference. The intensity of the motive could be measured by the increase in speed above the "unmotivated" level. If, in our illustration, the child's speed of running just for practice is, say, six feet per second and his speed of running for team work is ten feet per second, then his score of coöperativeness would be 10–6 or 10/6. Similarly the scores for other individuals could be found by finding their speed of practice and speed of team work.

This method, however, would assume that individuals do not differ in the degree of "freedom from load" in a situation of unmotivated work. It has been shown by Downey and others that individuals differ considerably in the extent to which they work at nearly top speed, even when told to work at their regular rate. Indeed, some individuals can hardly increase their speed above their practice level even when told later to work as fast as possible. It is evident, therefore, that, although taken at a common point of reference, individuals differ in their own speed range from motivated to unmotivated work. Thus, the unit of measurement would vary from person to person.

It is quite possible that the increment in speed due to motivation is not only a function of an individual's magnitude of speed but also of his variability in it. We must have, as in our illustration, in addition to the practice level, a record of efficiency under *two* different forms of motivation. One might then be measured in terms of the other. The ratio of the increments in speed of a team race to that of a "personal" race may be used as a measure of a child's relative coöperativeness just as we measure

the weight of any object by comparing it with another object used as a standard weight.

The Process of Measurement

When the motive to be used as a standard is chosen, two ways of comparison present themselves:

a. Observation of Efficiency

By measuring the efficiency of work under practice, under the "standard" motive, and under the motive to be measured, the two increments can be compared.

This aspect of comparison may be represented by the following simple scheme: Arbitrarily taking the increment in efficiency produced by the motive of competition as the standard, we can use it in measuring the intensity of the motive of coöperation. Let P represent speed under practice without apparent motivation; S, speed under personal competition; G, speed under group coöperation. Then $S - P = s$ is the increment produced by the motive of competition, and $G - P = g$ is the increment produced by the motive of coöperation; we can then express G in terms of S, either as a ratio of the increment or as a difference. $g/s = K$ and $g = Ks$ or $g - s = K$ and $g = s + K$, where K varies for each individual, being the index of his coöperativeness. Given these basic measures for a group of individuals, we can find K for each and distribute them on a scale of coöperativeness: $K > 1$ or $+ K$ indicates an individual whose efficiency under coöperation is above that of competition, $K < 1$ or $- K$ conversely indicates an individual whose efficiency under coöperation is below that of competition; and $K = 1$ indicates an individual whose efficiency in work for self equals that of work for others.

b. Observation of Choice

Another way of measuring the relative intensity of two motives would be to present the opportunity to choose *one* of the two motives and observe the choice that is made. The one chosen has evidently the stronger appeal. If an opportunity is presented to run either for a personal prize or for a team and choice is made to run for the team, the latter is the stronger motive of the two. By repeating the opportunity a number of times and

observing each choice, the ratio may be taken as the index of the relative intensity of the two motives.[2] If in a number of opportunities of running either for team or for a prize the child chooses X times the former and Y times the latter, the intensity of the former becomes X/Y or $X-Y$.

Individual Differences. When these measures of efficiency and choice are available, the relative intensity of the two motives can be objectively measured. If these measures are then given to a number of individuals they can be ranked according to score attained. The score would be a quantitative measure of the individual differences in the relative appeal of the motives under consideration. In our example a precise measure of each child's relative devotion to his team could be determined.

Practical Limitations. Were it not for practical limitations, actual life situations involving competition and coöperation would have been chosen. To follow up a group of children, to study their social life, the extent of participation in group activities of each member of the group, would be indeed of incalculable value toward the understanding of human interaction.

Such a plan, however, is well nigh impossible. Aside from the unlimited amount of time and effort such study would require, its findings would not lend themselves readily to precise measurement and comparison. How much is one more coöperative than the other? How trivial must a self-denial be before every one would be ready to undergo it? How burdensome must a self-denial be before every one would balk at undergoing it?

Isolation of Motives. In order to measure the relative intensities of the motives competition and coöperation, the two had to be isolated. In one case there was to be nothing but personal interest, in the other nothing but social gain. The isolation of the latter was somewhat difficult to obtain. In team work, for instance, there is really an admixture of personal and

[2] The term "choice" refers to the *act* of responding to one rather than to the other of two simultaneously presented stimuli. It does not refer to the individual's conscious experience of choosing. The assumption is made that the incentive responded to more often is the stronger one. If a suspended needle is deflected upward in a magnetic field in spite of gravitation pulling in the opposite direction, the "choice" is a definite indication that the former is of greater intensity. Of course, an individual might change his choice from time to time, just as he might change his response toward, say, food, reacting once favorably and again unfavorably toward it. The deflection of the needle, in the above example, will also change depending upon the *strength* of the magnetic field.

social interests. It was possible, however, to reduce the personal gain to a minimum by arranging the situation so that the individual's identity was apparently lost. A child was asked to participate in a group project without attaching his name to his share of work and without his awareness of being observed or tested. Opportunity was given to each individual to do as much or as little as he desired—even to stop whenever he pleased.

The two motives in this research were presented in the following scheme:

1. *S* (self interest)

"Work on test *x* at your very best in order that you may get a prize and recognition. Write your name on your work."

2. *G* (group interest)

"Work on test *x* at your very best in order that your group or team may gain a prize and recognition. Do not put your name on your work."

Nature of Group. The interaction between an individual and his group undoubtedly affects his coöperation with it. It was necessary to measure one's coöperation with various kinds of social groups. Those which were selected here for investigation were the following:

1. One's classroom.
2. One's team.
3. One's partner.
4. One's sex group (boys *vs.* girls contest).

Nature of Function. The function to be used, the task to be performed, under the two motives should comply with the following requirements:

1. The task should consist of measurable units, preferably small units, or intervals.
2. It should be a task in which qualitative differences are reduced to a minimum, and where the score, for which recognition is to be attained, is definitely quantitative.
3. Every individual tested should be able to perform the task, i.e., it should be a test of speed and persistence rather than of "power" and capacity.
4. The function itself should be one of high reliability. If

no variations are introduced, an individual's score or rank on one occasion should be practically the same as on another.

5. It should be made difficult by prolonging it for so long a period that fatigue, ennui, distraction should tend toward discontinuation. Work would then signify so much effort evoked by the motives to overcome the resistance.

The actual functions tried out in this research were:

A. Pencil and Paper Tasks (predominantly mental).
   1. Speed of doing simple additions (examples per minute).
   2. Complicated arithmetic (additions, subtractions, and multiplications).
   3. Speed of writing, copying letters and digits.
   4. Speed of cancellation.
   5. Speed of dotting.
   6. Speed of recognition of similar and dissimilar numbers.
   7. Speed of learning simple digit-symbols.
   8. Speed of work under auditory distraction (to count the frequency of tapping while working).
   9. Speed of work under visual distraction (pictures dispersed throughout the test blank).
   10. Work involving an opportunity for deception.

B. Extra-Class Activity (predominantly physical).
   1. Speed of running (feet per second).
   2. Broad jumping (in inches).
   3. Strength of grip (dynamometer).
   4. Weight lifting (in pounds).
   5. Weight carrying (pounds times distance).

In each of these fifteen functions the output in work for self was compared with that in work for the group.

All of the above techniques were tried out on small groups. The speed of arithmetic work gave the highest reliability as a measure of speed (.9874)—when repeated 12 times—and it was therefore adopted as the main function which was given to the total population.

The Problem

The problem was threefold:

A. To measure the relative intensity of two types of motives by a *behavior test.*

1. Working for a personal gain.
2. Working for a social gain.

B. To investigate the nature of the differences in the two motives. To what extent is each of these motives affected by fatigue, difficulty of a task, etc.? A score of coöperativeness on the basis of the two scores of A.

C. To ascertain the factors that go with or make for a high degree of coöperation. What is the relationship between cooperation in a single task objectively measured and general coöperativeness as indicated by ranking on coöperation by teachers, classmates, and parents? How is age, intelligence, and social knowledge related to coöperation? To what extent does the home, school, and general environment affect one's cooperativeness?

Part A is the basic section of this investigation. The test was given to 1,538 children of Grades V-VIII differing in age, intelligence, and social status under uniform conditions. They performed the same task under the motive of a personal gain and again under the motive of a social gain. The efficiency and persistence of work in the two situations and the choice between them measured the relative strength of the two motives.

Part B consisted of an analysis of the data and additional retests. Different variations in type of work and form of cooperation were measured, each of them being treated as an independent experimental factor. A few groups were retested without any variation. They served as control groups.

Part C—Fortunately this research was carried out on the population investigated by the Character Education Inquiry of Teachers College. For each child various records of behavior were available—a series of scores on character, criterion measures for various behavior patterns, and numerous factual data.

Previous Work on the Effect of Motivation

Knowledge of Results as a Motive

There is experimental evidence that knowledge of results increases both rate of work and amount of work done in ergographic tracing [Arps, 7] [3] and in tallying [Ross, 109]. Such

[3] Throughout this study numbers in brackets refer to references in the Bibliography, pp. 165 to 172.

motivation was shown to increase the amount of gain in additions, substitutions, and cancellations [Chapman and Feder, 32]. An increase in gain and in accuracy was found to be the result of knowing the results. The increase held true for individuals as well as for groups [Book and Norvell, 17].

Judd [71] found that no improvement took place when the subject was ignorant of the results. Practice alone was ineffective in learning if the motivation brought about from knowledge of results was absent. Spencer [121] reported that improvement resulted from practice even without knowledge of results.

The effect of knowing the purpose of the work upon efficiency was investigated by Wright [149]. He found that

1. More work was done under the stimulus of having a set task than when working without a definite aim.
2. The knowledge of impossibility to accomplish the required conditions decreased the subject's work.
3. Fatigue is greater when there is no aim, though the output is less.

The Effect of Competition

In any study of incentives the element of competition holds a prominent place. It usually causes an act to be performed better or faster than it is performed by others or than the individual himself performed it before. Binet and Vaschide [14] have shown that appealing to children to break their own records always resulted in improvement.

The class motive in this study was also based on competition, to help one's class compete with another class. What would be the result if a contest between classes were arranged without the idea of just working *for class* or helping the class win? Bykowsky [25] investigated the problem of group competition. He found: (1) that competition between groups will bring forth greater effort than individual work without competition (practice); (2) that the speed of work under such competition will be equal to the speed of work in competition within a class (self motive); (3) that the speed of work was greatest when the two competing groups were chosen by captains elected by the children (teams).

W. Moede [90] measured the effect of rivalry upon the speed of tapping and strength of the grip. He experimented with 17

boys of ages 12 and 14. He found that competition resulted in a leveling tendency. The effect of rivalry like that of social facilitation varied inversely with the ability of the worker. The most rapid workers did poorer in competition than when working alone. The slowest individuals, on the other hand, showed the greatest improvement.

Moede attempted also to measure the effect of competition between groups (teams of 5). He found that such competition brought greater increase than rivalry between individuals. It should be added, however, that extremely small numbers of cases were used. Furthermore, the rivalry between groups can not be looked upon as a measure of group loyalty because the amount of work done by each member was known and thus the element of social approval was involved. In the present study, all work done for a group or team in competition with another group or team was strictly impersonal, no names were written on the work done for the group. An individual could slow down or actually stop working whenever he pleased.

Triplett [145] found that older children did better under competition while young, nervous, and excitable subjects, prone to overstimulation through rivalry, showed a lowering of efficiency in competitive performance. He found that a higher percentage of girls than of boys showed increased performance under competition.

The effect of rivalry upon the work of adults was measured by Whittemore [147]. His subjects were 12 college students. The task consisted of printing of paragraphs with individual rubber types, 4 tests of 5 minutes each. Some of these 12 students were also arranged into groups. One group was told the score of the other and encouraged to rivalry. He found that *all* subjects did better under competition than without it and the slowest workers improved most. The quality of work under competition is lower than when not competing. Competition between small groups called forth greater speed than competition with one another. The quality of work in group competition was *not* lower than when competing with one another. Most of the results are based upon groups of 3 or 4 subjects.

A more extensive investigation on the nature of competition was carried out by Hurlock [67].

A group of 155 children of Grades IV and VI were tested. The

task consisted of a modified form of the Courtis Research Test in Arithmetic, Addition Form. A control and an experimental group were used. The 2 groups were tested 5 times, 10 minutes each. From the second through the fifth day the experimental group was highly motivated by a well-arranged competition. The results indicated that competition resulted in an increase of speed over the control group on each day of the testing. A slight sex difference in favor of the girls was found. The younger children responded *more* to the influence of rivalry than did the older ones.

Children inferior in arithmetic showed greater increase under competition than children of average or superior capacity. The rivalry group improved in accuracy throughout the experiment while the control group decreased in accuracy.

In these experiments the periods of testing were short.

A period of 5 or 10 minutes of testing may give an indication of the initial spurt called forth by a motive but may not be an indication of the speed under that motive if the work were to continue for some time. In the present research it was found that while the motive of working for one's group is as potent as that of working for oneself in the beginning of the test period, it gradually weakens, and, after 20 minutes of work, results in a significantly lower speed.

A Study in Types of Motives

An attempt to measure the effect of three different motives upon physical and mental activity was made by Müller [97]. Small groups of children were tested on such activities as arithmetic and skill in cutting out paper figures. The effect of the following motives was measured:

1. Competition: "Try to do better than others."
2. Practical utility: "Do you know why this work is good for you?" (The examiner then explained the benefit of skill in that kind of activity.)
3. Altruism: "If you do exceptionally well to-day I will give you something which you may give to someone as a present."

The investigator found that the motive of altruism always resulted in increased efficiency. The motive of competition also caused an increase particularly among the younger children of the group.

The investigation was carried out on a few extremely small groups. The motivation, particularly the one called altruism, was too verbal and vague in nature. It is at least questionable whether the idea of *receiving* a prize or that of giving the prize to someone else was the incentive.

A Measure of Group Loyalty

McCaskill [33] used a test by which he attempted to measure group loyalty. The examinees were given a choice between two tests. One of those led to a group prize and the other to an individual prize.

The situation, however, involved other elements besides group loyalty. Those subjects who chose to work for the group might have done so because they felt unable to compete with the others (the test involved knowledge of sport matters). The fact that they were to write their names upon the choice ballot might have influenced some of them to choose working for the group for the sake of social approval.

An Experiment in the Relative Appeal of Personal and Group Motivation

The Soviet government recently set up an experiment on the problem of whether children are more interested in group or in individual activities. An experimental school having 50 children was provided with two plots of gardening ground. One of these gardens belongs to the school as a whole, common property. The other garden was divided equally among the students of that school, each one being given just a little plot in it. Each child spends a certain number of hours of the day in gardening. He may spend it either on the common garden or on his own property. The teachers are keeping careful notes of the exact amount of time spent by each child on the individual and on the group property, also of the quality of work on the two gardens. This experiment is to extend over a period of three years [152].

Studies in Helpfulness

An extensive research in the realm of helpfulness and cooperation was carried out by the Character Education Inquiry. Those tests will be described in Chapter V in connection with intercorrelations with our tests.

CHAPTER II

COMPETITION AND COÖPERATION

Purpose of Investigation

The aim of this research was to measure the effect of personal and social motivation.

The questions to be investigated were:

I. Efficiency:

a. What is the immediate and continuous effect of competition upon children's efficiency as compared with unmotivated work?

b. What is the immediate and continuous effect of the motive of coöperation upon children's efficiency? How long and how efficiently will children go on working for the good of their group when there is no evident personal gain nor name attached to the work?

c. How does the latter efficiency compare with work under competition and with unmotivated work?

II. Choice:

a. To what extent will children choose to work for their group rather than work for themselves?

b. To what extent will children contribute their work *done* to the group if withholding it would be of personal advantage?

Technique

In order to be able to measure the effect of motivation and the difference in effect produced by different motives, it was necessary to have a reliable measure of performance which would be sensitive to initial individual differences and to the variability of an individual's performance.

The task chosen was similar to that used by Kraepelin and others—simple one by one place additions. The digits 1 and 0 were not used and the combinations of like digits (as 2 + 2)

were avoided. There were thus 56 possible combinations. Each test booklet contained forty pages, one hundred examples each, four thousand examples in all.

A Test of Unmotivated Work

The aim of this test was to find the speed of work of each child under no apparent motive. The children were told that they were going to have practice work in additions. The average of two practice units was taken as the speed of unmotivated work. The directions were—"Do not write your name on this paper. This is only for practice. Write the word practice at the top, and when I say go, begin adding and work until I tell you to stop." They worked exactly one minute and then turned to the next page and after the signal to begin worked again for exactly one minute.

Personal and Social Motivation

Self Motive

The self motive used was one of ordinary competition for recognition and reward. The subjects were told: "You are now going to have a speed contest, to find out your speed of work in additions. This test will tell us who is the fastest worker, the second fastest, third fastest, and so on to the very slowest worker in this class. Prizes will be given to those who will do fast work. Every one of you has a good chance to win a prize. When I say 'Go' you will start to add and continue until I tell you to stop. The faster you work, the higher will be your score."

Group Motive

The group motive used consisted in creating a contest between classes. It was similar to the intraclass competition used to measure the self motive. "This is to find out which class in this school is fastest, second fastest, third, fourth and so on until the very slowest one. Class prizes will be given to those classes which will do fast work. This class has a good chance to win a prize. The classes that will not try hard will naturally be at the bottom of the list." The children were told not to write their names on these sheets but to write the name of their respective class (as 7A). "The score of your class will be the

number of examples all of you do for your class." The identity of each child was determined by means of a symbol which appeared also on the self papers.

Repetition of Tests

The tests of work for self and work for class were repeated twelve times, two minutes each. The motives of self and class were alternated six times, respectively. The problem of practice effect was thus practically eliminated. All conditions of work, aside from the motives, were identical. The two motives were brought into comparison six times. The speed score of self work was the mean of twelve units of work on the self tests. The speed score of class work was similarly the mean of twelve units of work on the group tests.

On the basis of the relationship between the speed of self and class work a score of coöperativeness was developed, a score which indicated the extent to which a child worked for his group as compared with his work for himself. This score was the average of twelve differences in speed of work.

The Free Choice Test

The tests described above attempted to measure the effort called forth by two given motives. There was no overt conflict between them. The Free Choice test attempted to throw the two motives into open conflict. Opportunity was given to continue working for self *or* for class. Each minute's work performed for class involved that much of a loss in one's own score. This test was given after the alternating tests. It consisted of seven minute-units of work. The directions used were:

"There are seven more sheets. You may work on as many of these as you wish for yourself and on as many as you wish for your class. You may even do all the tests for yourself or all of them for your class. Whatever you do for yourself will add to your own score and whatever you do for your class will add to the class score. At the end of the test I will collect all papers at one time. Look at the next sheet. If you write your name on it, it will count for yourself and for your own score. If you write the name of your class on it, the additions will count for your class. When I say 'Go' write either your name or the name of your class on the sheet and begin to add."

After sixty seconds the examiner said "Stop." "Put this sheet to one side. Turn to the next sheet. When I say 'Go' write either the name of your class or your own name at the top according as you wish the examples to count for the class or for yourself, and begin to work."

Directions like the preceding were given five more times, alternating the order in which self and class were referred to.[1] The score on this test of Free Choice was the number of decisions made to work for class. It was not merely a vote because the examinees were required in each case to go on working for the goal decided upon. The scores thus ranged from 0, when no work was done for class, to 7 when all the work was given to class. An odd number of units was chosen to avoid the possibility of simply dividing the units of work, doing one-half for self and one-half for class. The examinees were thus forced to make a decision as to which goal they preferred.

Speed of Voluntary Work

After a subject decided to work for himself or for his class he naturally went on to do that minute's work for the purpose he had chosen. The speed of that work for self or class was treated separately. In a certain sense this is a measure of the quality of work, while the number of decisions is the quantitative measure of the relative strength of the predominant motive.

The Control Groups

In order to measure the immediate and continued effect of motivation, it was necessary to have measures of continuous unmotivated work showing its normal variability and the effects of fatigue, ennui, etc. The following controls were used:

1. Six groups were given the task of doing simple additions without any motivation. The period of actual work was forty minutes. They were to stop after each minute's work and draw a line across the page. There was thus a record of forty measures of continuous work for each child.

2. One of these six groups was given the same task five days in succession.

[1] The directions for the last unit of choice were somewhat different (see Appendix A). They involved the giving away to the group a unit of work previously done for practice.

Two Scores of Coöperativeness

The relative intensity of the social motive was measured by the difference in efficiency between work for self and work for the group, as well as by the ratio of the increments in speed. The number of times a child had chosen to work for his group constituted another coöperation score.

Test Conditions

An attempt was made to keep constant all conditions of testing. To avoid the teachers' influence, which might differ from class to class, the teachers were always excused from the room during the period of testing.

Although a number of examiners were employed, the directions used were identical. Only people with considerable experience in testing were employed as examiners. This was particularly important in the speed-alternating test which required the examiners to stop exactly after sixty seconds in each of thirty-four test units.

The Population

The population tested consisted of 1,538 children divided into forty-four groups. They comprised children from Grades V through VIII and ages 8 through 17. These children were enrolled in ten different schools. The following table gives the schools and groups tested, the number of children within each of the forty-four groups and the number of boys and girls within each group.

Description of Population

Schools E and H are in a well-to-do neighborhood in New Haven. Most of the parents are of professional or business status. Three-fourths of them are American born: school E—3 classes, Grades V and VI, 103 children; school H—3 classes, Grades VII and VIII, 120 children. These two schools will be treated as a unit because of their identical environment, and will be referred to as School E. (Table 1.)

School L is a public school in a poor, congested district in New Haven. The parents of the children are mostly unskilled laborers. Two-thirds of them are foreign born. Of these, 41 per cent were born in Italy, 28 per cent in Slavic countries, and

15 per cent in Ireland. School L—7 classes, Grades V to VIII, 314 children.

School W is the only school of Walden, New York. This town has a population of about 5,000 and is located 65 miles from New York City. All the children of the town of Grades V to VIII were tested. The children are subjected to a uniform environment, with well-standardized conventions and customs. The

TABLE 1

DISTRIBUTION OF 1,538 CHILDREN TESTED, BY SCHOOL, CLASS, AND SEX

I

EXPERIMENTAL GROUPS

Group	School	Symbol	Grade	Number	Boys	Girls
1	L	A	V	46	26	20
2	L	B	VI	47	22	25
3	L	C	VII A	45	21	24
4	L	D	VII B	46	27	19
5	L	E	VII C	42	21	21
6	L	F	VIII A	43	22	21
7	L	G	VIII B	45	24	21
School L Total				314	163	151
8	E	H	V	37	22	15
9	E	I	VI A	32	23	9
10	E	J	VI B	34	10	24
School E Total				103	55	48
11	H	K	VII A	37	21	16
12	H	L	VII B	41	20	21
13	H	M	VIII	42	19	23
School H Total				120	60	60
14	W	N	V A	27	14	13
15	W	O	V B	34	16	18
16	W	P	V C	32	20	12
17	W	Q	VI A	28	14	14
18	W	R	VI B	41	24	17
19	W	S	VII A	34	15	19
20	W	T	VII B	41	16	25
21	W	U	VIII A	15	8	7
22	W	V	VIII B	25	12	13
School W Total				277	139	138
Experimental Group Total				814	417	397

TABLE I (*Continued*)

II
CONTROL GROUPS

Group	School	Symbol	Grade	Number	Boys	Girls
23	T	A′	VII B	33	14	19
24	T	B′	VII D	36	17	19
25	S	C′	VI A	40	21	19
26	S	D′	VI B	40	20	20
Schools T & S Total				149	72	77
27	N	E′	VII A_3	42	17	25
28	N	F′	VII A_4	36	12	24
29	N	G′	VII B_1	32	18	14
30	N	H′	VII B_3	43	19	24
School N Total				153	66	87
31	B	I′	VI A_1	42	23	19
32	B	J′	VI A_2	40	18	22
33	B	K′	VI B_1	43	20	23
34	B	L′	VI B_2	39	21	18
35	B	M′	VI B_3	45	24	21
36	B	N′	VI B_5	41	21	20
School B Total				250	127	123
37	K	O′	V	24	13	11
38	K	P′	VI	16	10	6
39	K	Q′	VII	21	12	9
40	K	R′	VIII	27	16	11
41	Z	S′	V A	22	10	12
42	Z	T′	V B	22	14	8
43	Z	U′	VI A	29	24	5
44	Z	V′	VI B	11	7	4
Schools K & Z Total				172	106	66
Control Group Total				724	371	353

SUMMARY BY GRADES

Grade	Number	Boys	Girls
V	244	135	109
VI	568	302	266
VII	529	250	279
VIII	197	101	96
Grand Total	1,538	788	750

parents, 80 per cent native born, are mainly of English extraction. Although all economic levels are represented, they tend to cluster at the center of the social scale. It is a typical "average" small community. School W—9 classrooms, 277 children.

The above four schools constitute the major population. A uniform procedure of testing was used. Most of the data to be presented will be based upon records of these 814 children. There were a number of additional groups. Most of them were used as control groups, and for the purpose of validating the testing technique. These groups were as follows:

School N—A school of mixed population in Manhattan, New York City, of upper middle class status. Two classes of selected high and two of selected low intelligence. (Grade VII, 4 classes, 153 children.)

School B—A school within a high class metropolitan neighborhood in Brooklyn, New York—5 classes, Grade VI, 250 children.

Schools K and Z—Two religious schools in the Bronx, New York City, middle class neighborhood, Jewish. K—4 classes, Grades VII-VIII, 88 children; Z—4 classes, Grades V-VI, 84 children.

School S—A school in a middle class neighborhood, New Haven—2 classes, Grade VI, 80 children.

School T—A junior high school—a modern progressive school in New Haven, in an upper middle class district. Social Science is greatly emphasized—2 classes, Grade VII, 69 children.

CHAPTER III

RESULTS

The data to be presented consist of two sets of scores:

I. Characteristics of work under personal and social motivation:
   A. The measures of speed when working for self, when working for a group, and when working under no apparent motivation. The nature of the work curves.
   B. The choice to work for self or for the group, when opportunities of choice are presented.

II. Individual differences in coöperativeness:
   A. The relation between speed of self work and group work expressed as a ratio or a difference.
   B. The relation between the number of choices made to work for self and the choices made to work for the group.
   C. The combination of the above into one score of cooperativeness.

This chapter will present the data on the scores pertaining to Section I. The results obtained from the derived scores measuring individual differences in coöperativeness will be given in Chapter IV.

A. The Efficiency of Work under Personal and Social Motivations

Tables 2 and 3 present the amount of work done by the "average" child in twelve minutes of work for self and in twelve minutes of work for the group. The data are presented for three different schools and for the total population.[1]

The first column of the tables gives the symbol of each of the three schools for which data are presented; the second column gives the number of cases in each school. Columns "S" and "G"

[1] Detailed data for twenty-two groups are presented in extensive tables filed at Teachers College, Columbia University.

TABLE 2

AMOUNT OF WORK DONE FOR SELF AND FOR GROUP IN PERIODS OF TWELVE MINUTES EACH

SCHOOL	N	S	G	G/S	G–S	σD	D/σD	MINIMUM
L	314	601	547	.91	—54.0	5.40	10.0	37.8
E	223	516	485	.94	—31.2	3.48	8.8	20.8
W	227	551	539	.97	—12.0	2.28	5.1	5.2
Total	814	556	524	.94	—32.4	2.52	13.2	24.8

TABLE 3

AMOUNT OF WORK DONE IN WORK FOR SELF AND IN WORK FOR GROUP PER MINUTE

SCHOOL	N	S	G	G/S	G–S	σD	D/σD	MINIMUM
L	314	50.1	45.6	.91	—4.5	.45	10.0	3.15
E	223	43.0	40.4	.94	—2.6	.29	8.8	1.73
W	227	45.9	44.9	.97	—1.0	.19	5.1	0.43
Total	814	46.3	43.6	.94	—2.7	.21	13.2	2.07

show the number of examples done in 12 minutes, and per minute, in work for self and for group, respectively. Column G/S presents the ratio of the scores and column G–S their difference. The last three columns will be discussed in a later paragraph.

It is seen from Tables 2 and 3 that the amount of work done under personal motivation was consistently greater than the amount done under social motivation in each of the three schools. The average child did 32.4 examples less in the group tests than in the self tests, though he spent exactly 12 minutes on each set of tests. The average speed per minute in self work was 2.7 examples higher than (the speed) in group work.

Reliability of Difference

How certain can we be that such differences between S and G speed are not the result of mere chance fluctuations? Allowing for all possible chance variations, what minimum difference might we expect with practical certainty, if several similar samplings of the population were given these tests? The last three columns give the S.D. of the difference,[2] the difference in terms of its S.D., and the minimum difference.

[2] $\sigma D = \sqrt{\sigma_S^2 + \sigma_G^2 - 2r_{S,G}\sigma_S\sigma_G}$

In each of the three schools the difference is far larger than three times its S.D. and for the total it is more than 13 S.D. We can be practically certain that the difference will not be less than 24.8 examples between 12 minutes of self work and 12 minutes of group work, or 2.1 examples difference per minute in favor of self work. The "minimum" is the excess of the difference above three times its S.D.

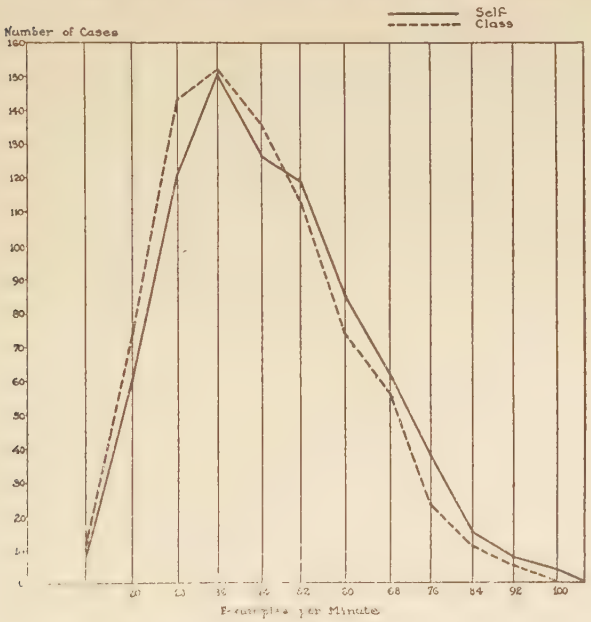
Uniformity of Difference

The frequency distributions of S and G scores throw further light on the G-S differences. If the differences were due to

FIGURE I

Distribution of Speed Scores

In Work for Class and Work for Self (802 Cases)



chance the two distributions would be identical except for minor fluctuations. If the G scores, however, are definitely and regularly lower than the S scores at any given level of speed, the frequency distributions should reveal the uniformity.

Figure I gives the frequency distributions of S and G speed for 802 cases. It will be noted that in the lower half the G scores

had higher frequencies. In the upper half the S scores had higher frequencies.

The Work Curve Under Personal and Social Motivation

The preceding data involved single scores of work for self and for group. Those scores were either totals, the amount of work done per child under alternating self and group motivation, or speed per minute of work under each of those motives. As there were six test units of self work and six units of group work it was possible to construct the curve of work under each of the two forms of motivation. Table 4 presents the means of each of the six units of self, and of group work. This table shows the effect of continuous work upon efficiency under each form of motivation. Each test unit represents two minutes of work.

TABLE 4

MEANS OF SIX SUCCESSIVE ALTERNATIONS OF SELF WORK AND GROUP WORK

SCHOOL	N		1	2	3	4	5	6
L	314	S	100.6	97.4	99.8	99.4	101.4	103.0
		G	94.8	92.8	55.4	94.0	89.8	88.2
		D	−5.8	−4.6	−4.4	−5.4	−11.6	−14.8
E	223	S	84.0	83.4	87.2	86.8	85.0	84.2
		G	81.6	80.6	83.8	81.4	74.2	71.8
		D	−2.4	−2.8	−3.4	−5.4	−10.8	−12.4
W	277	S	88.0	90.8	93.0	93.6	93.2	92.4
		G	89.6	90.2	91.2	91.6	87.8	87.8
		D	+1.6	−0.6	−1.8	−2.0	−5.4	−4.6
Total	814	S	90.8	90.8	93.4	93.4	93.4	93.6
		G	89.0	88.2	90.4	89.4	84.6	83.4
		D	−1.8	−2.6	−3.0	−4.0	−8.8	−10.2

The difference in speed between self and group work increased consistently with the progress of work. This holds true for each of our schools. Even the children of the most coöperative population, W, whose speed of group work was higher than the speed of self work in the first test units show a consistently increasing difference in favor of self work.

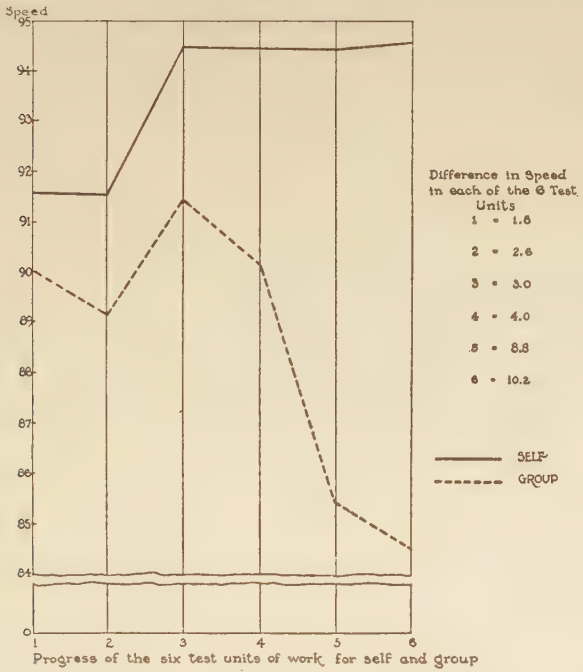
Work for self was more constant, exhibiting a definite tendency to rise while group work, though always lower, was less

constant and tended to decline. This is shown clearly in Figure II, giving the curves of work for self and group.

The difference in speed between S and G work seems to be largely a difference in persistence. Fatigue and ennui that set in during the work gradually eliminate all the intrinsic stimuli that may make for speed as skill, habit, satisfyingness in doing

FIGURE II

THE SPEED OF WORK FOR SELF AND GROUP DURING SIX TEST UNITS



work, etc. The remaining reason for going on working is the motive introduced by the experimenter. It is therefore only after a long period of work that such a motive is really measured and that two forms of motivation are best compared and discriminated.

Fatigue

The preceding paragraphs showed the speed of work for self and group throughout the progress of 24 minutes of work. It

was apparent that the difference in speed increased as the work went on. The effect of continuous work upon the G–S becomes even more conspicuous if we compare the first with the last unit of the alternating tests. Table 5 presents the mean speed of work during the initial and final periods for self and for group work. Subtracting the initial from the final means will give the effect of fatigue upon self work and upon group work.

TABLE 5

EFFECT OF FATIGUE UPON SPEED OF WORK FOR SELF AND FOR GROUP

SCHOOL	SELF			GROUP		
	Initial	Final	Diff.	Initial	Final	Diff.
L	49.5	52.2	2.7	46.9	44.5	—2.4
E	41.8	42.3	0.5	40.6	36.5	—4.1
W	44.7	46.4	1.7	45.0	43.9	—1.1
Total	45.4	46.8	1.2	44.3	42.0	—2.3

It will be noted from Table 5 that the speed of work for self during the final period is consistently higher than the speed during the initial period of testing. The speed of group work, however, is definitely affected by continuous work, for the speed of the final units is consistently lower.

The Ratio of Increments

The gross efficiency in work for self and for group was taken thus far as the score of S or G. The relationship between the two, in the form of the difference G–S or the ratio G/S, was expressed in terms of those raw scores. Each was thus a measure of speed above the level of an absolute zero. But each of these motives is superimposed upon a host of other subordinate motives, such as the schoolroom situation, the examiner's request, the desire to work, etc. Each of these minor motives would suffice to make a child work at his habitual "unmotivated" speed. The motives of working for self or for group, then, begin to act from that level. Any *increment* in speed above it would be the result of the motive and nothing but the motive. The relative intensity of the two motives could then be expressed as the ratio of those two increments.

The practice score P (see Chapter II for description of tech-

nique) was taken as this unmotivated speed. (It was the average of two practice minutes.) P was subtracted from S, speed of self work per minute, to give s, and from G to give g, the residuals of the self and group motives, respectively. Table 6 presents the results for three schools.

TABLE 6

INCREMENTS PRODUCED BY SELF AND GROUP MOTIVATION ABOVE THE UNMOTIVATED SPEED LEVEL

SCHOOL	N	P	S	G	s	g	g/s	g–s
L	314	44.8	50.1	45.6	5.3	0.8	.15	—4.5
E	223	37.3	43.0	40.4	5.7	3.1	.54	—2.6
W	277	41.0	45.9	44.4	4.9	3.4	.69	—1.0
Total	814	41.2	46.3	43.6	5.1	2.3	.45	—2.7

Column P in Table 6 gives the average speed per minute of practice work for each of the schools; columns S and G give the speed of self and group work; columns s and g give the increments in speed produced by the motive of self and group; column g–s is the difference in increment. This column is obviously the same as column G–S in Table 2, for G–S = (G–P) — (S–P). Column g/s gives the ratio of the increments.

Table 6 indicates the following results:

1. Either one of the motives has produced an increment above the level of unmotivated work in each of the three schools.

2. The increment produced by the motive of self is larger than the one produced by the motive of group in each of the three schools.

A Unit of Motivation

For the purpose of comparison we may take the motive of self as a standard and its resulting increment as a standard unit of motivability. Increments produced by other motives may then be expressed in terms of it. This unit of motivation, which we shall refer to as M, was for our total population 5.1. The effect of the motive of working for a prize increased the speed above the level of no motivation to the extent of 5.1 examples per minute. The intensity of the group motive was 2.3/5.1 or .45 of M.

The effect of the group motive in each school can be expressed in terms of the respective M. In the least coöperative population (L), the intensity of the group motive was only .15 M, while in the most coöperative population (W), it was .69 M.

Initial Increments

The preceding section compared the average speed of self work and group work with the speed of unmotivated work, showing the ratio of the two increments. It remains to compare the initial increments produced by the two motives.

Table 7 presents the data for this comparison. P is the same as in the previous table. S_1 and G_1 are the average speeds per minute during the initial two minutes of self work and group work, respectively: s_1 and g_1 are the increments in speed above the unmotivated level: g_1-s_1 is the difference between the increments and g_1/s_1 is the ratio between the two.

TABLE 7

Initial Increment Produced by Self and Group Motivation

School	N	P	S_1	G_1	s_1	g_1	g_1-s_1	g_1/s_1
L	314	44.8	50.3	47.4	5.5	2.6	— 2.9	.46
E	223	37.3	42.0	40.8	4.7	3.5	— 1.2	.74
W	277	41.0	44.0	44.8	3.0	3.8	+ 0.8	1.03
Total	814	41.2	45.4	44.5	4.2	3.3	— 0.9	.79

The above table indicates the following results:

1. Each of the motives produced an initial increment in speed above the unmotivated speed level in each of the schools.

2. The motive of self produced a slightly greater increase in two schools and a slightly smaller increase in the third school.

3. The difference between the two forms of motivation in the initial increment produced is rather small, inconsistent, and statistically insignificant.

Retentivity of Self and Group Motivation

The scores of S and G thus far presented were scores of test units. Each test unit, however, consisted of two minutes' work, the average of which was taken as the score of the unit. It will be recalled from the testing technique described in Chapter II

that the stimulus to work for self or for group and the promise of prizes were always given before the first minute of work. At the end of that minute the subjects were told to stop, turn over the sheet and continue working. The stimulus of self or group was not repeated before the second minute of each unit.

The efficiency during the second minute was thus the result of a stimulus acting after a lag of one to two minutes.

For convenience of presentation, we shall call the speed of the first minute of each test unit speed A, and that of the second minute, speed B. Table 8 presents the scores of A and B of the six tests of work for self and of work for the group.

TABLE 8

SPEED OF A AND B IN WORK FOR SELF AND GROUP

TEST	SELF			GROUP		
	A	B	Diff.	A	B	Diff.
1	47.0	44.0	3.0	45.7	42.8	2.9
2	46.9	44.3	2.6	46.3	42.6	3.7
3	48.0	45.3	2.7	46.0	43.9	2.1
4	47.4	45.5	1.9	45.3	43.7	1.6
5	47.5	45.7	1.8	43.0	41.4	1.6
6	47.8	45.5	2.3	42.8	40.1	2.7
Total	47.43	45.05	2.38	44.85	42.42	2.43

Table 8 reveals the following points:

1. The speed of the second minute's work (B) is universally lower than the speed of the first minute's work, in each one of the test units. This holds true for self work as well as for group work. This same observation was found in the means of each of the twenty-two classrooms.

2. The drop from A to B has a small negative acceleration in the case of the S tests, and zero acceleration in the case of the G tests.

3. Comparing the A's of self work with the A's of group work and the B's of self work with the B's of group work, it will be found that self work has in each case a higher speed.

4. The difference between the grand means of A and B of self work is 2.38 and the same difference for the A's and B's of group work is 2.43.

5. The difference between the grand means of the A's of self work and the A's of group work is 2.58, and that between the B's of self work and the B's of group work is 2.63.

6. The difference between self and group work is about equal to the difference between the first and second minutes of self work. The speed of the "first minute" units of group work (44.9) is nearly equal to the speed of the "second minute" units of self work (45.1).

This forms another way of expressing the relationship of the relative intensity of the two motives. The motive G is equal in intensity to motive S after a lag of one minute in the latter ($G_A = S_B$).

Correlation Between Self and Group Work

That the difference between speed of self and group work increases with the progress of work, has been evinced in the preceding tables. How does the increasing difference affect the rank of individuals in the two speeds? How is the correlation between speed of S and G work affected by the progress of the tests?

Table 9 presents the correlations between S and G scores for the initial and final periods of testing.

TABLE 9

Correlation Between Self and Group Work

School	N	*r* Si, Gi	P.E.	*r* Sf, Gf	P.E.
L	314	.800	.010	.663	.02
E	223	.935	.010	.800	.02
W	277	.960	.005	.889	.01
Total	814	.935	.002	.805	.01

In this table Si and Gi are the scores of the initial four minutes of self work and four minutes of group work, respectively. Sf and Gf are similarly the scores of the last four minutes of self and group work. The product-moment correlations were found between the initial S and initial G scores and also between the final S and final G scores for each school and the total population.

Table 9 shows that the correlations between S and G work

universally *decrease* with the progress of work. The speed of group work does not only become lower than that of self work but it also becomes less *like* the latter. This is in agreement with the fact that the variation of the G scores *increases* with the progress of work to a greater extent than the variation of the self scores.

Variation

As far as the central tendencies of speed are concerned, it was shown in the previous tables that the mean speed of self work is universally higher than that of group work. How does the dispersion of scores under one motive compare with that under another? This is shown in Table 10.

TABLE 10

Variation in Self and Group Work

School	N	σs	σg	Vs	Vg	D	σD	D/σD
L	300	16.70	15.83	30.3	30.8	.87	.27	3.32
E	219	11.58	10.97	34.1	34.7	.61	.19	3.21
W	273	14.58	14.04	34.3	33.5	.59	.135	4.0
Total	792	17.04	16.09	37.9	37.7	.95	.130	7.31

Columns σs and σg present the standard deviations of the self scores and group scores, columns Vs and Vg give the coefficients of variation (sigma over mean), and column D presents the difference in S.D., σD is the S.D. of the difference and D/σD is the ratio of the difference to its S.D. It is seen from this table that the S.D. of self work is definitely greater than that of group work. For the total population the difference between the sigmas is 7 times its own sigma. The self scores are definitely larger and their standard deviation is therefore greater. The sigmas divided by their respective means, the coefficients of variation, are larger for G than for S in schools L and E and smaller in school W. There is no consistent difference between S and G work in the degree of variation of individuals in speed.

Effect of Fatigue on Variation

The data presented in Tables 4 and 5 showed that the essential difference between S and G is the decrease of the latter as the work progresses. It is therefore interesting to note the

variation of the scores of S and G during the progress of the test units. Table 11 presents the S.D.'s and V's of S and G during the initial and final eight-minute periods of work.

TABLE 11

VARIATION OF S AND G SCORES DURING THE INITIAL AND FINAL STATES OF TESTING

SCHOOL	INITIAL PERIOD					FINAL PERIOD			
		Self		Group		Self		Group	
	N	S.D.	V	S.D.	V	S.D.	V	S.D.	V
L	302	17.15	30.0	16.2	30.6	19.22	34.0	17.32	35.0
E	222	11.62	33.5	10.85	33.0	12.11	36.0	11.48	38.0
W	286	14.42	34.0	13.80	32.0	15.02	35.0	15.05	37.0
Total.....	810	17.65	39.0	16.12	37.0	18.50	40.0	16.95	42.0

Table 11 reveals three important items concerning the variation of scores under the two forms of motivation.

1. The coefficient of variation increases with the progress of work in both work for self and work for the group.

2. The increase of variation in group work, however, is about five times as large as the increase in work for self.

3. In the initial period of testing the variation of self work is slightly larger. In the final period of testing the variation of self work is smaller than the variation of group work in each of the schools.

Individual Variability

There were twelve scores of self work and twelve scores of group work for each individual. It was therefore possible to find the degree of variability of each individual while working under either motive. In view of the labor involved this was done only for two classroom groups. The results are presented in Table 12.

Column Md/S gives the deviation of the twelve S scores from their mean, divided by the mean S. Similarly, Md/G gives the deviations of the twelve G scores from their mean, divided by the mean G. Columns σ and V give the standard deviations and coefficients of variation of the scores of individual variability.

TABLE 12

INDIVIDUAL VARIABILITY IN SELF AND GROUP WORK

CLASS	SELF			GROUP		
	Md/S	σ	V	Md/G	σ	V
LG	21.7	6.6	30	24.5	12.3	50
HM	35.3	10.3	24	37.0	17.9	48

Table 12 indicates the following points:

1. The average individual variation (unevenness of speed) of G scores is higher than that of S scores in each of the two classes.

2. The S.D. of the variations of G is about twice that of the variations of S. The V of the G variations is also much larger than the V of the S variation.

The unevenness of speed from minute to minute during the progress of work is definitely larger in the units of group work than of self work.

Evenness of Self and Group Means

It was shown in Table 4 that the means for both self and group work fluctuate from unit to unit. Figure II shows that the means of the self units varied less from one another than did the units of group work. The relative evenness of the two sets of work units can best be observed by a comparison of their standard deviations and coefficients of variation.

Table 13 shows the S.D. and V of the six *means* of self and group units.

TABLE 13

EVENNESS OF SELF AND GROUP WORK

SCHOOL	SELF				GROUP		
	N	M	S.D.	V	M	S.D.	V
L	314	50.1	0.9	1.8	46.2	1.3	2.8
E	223	42.6	0.7	1.6	39.4	2.2	5.6
W	277	45.9	1.0	2.2	44.8	0.7	1.6
Total	814	46.3	0.6	1.3	43.8	1.3	3.0

The S.D.'s and V's of the S units are *lower* than those of G in two out of the three schools and in the total.

Similarly the means, S.D.'s and V's were found for each of the

twenty-two classes in the experimental populations. The average coefficient of variation of the S units was 3.340, the average V of the G units was 4.227, their difference .887, and the S.D. of their difference 0.385. The difference in terms of its σ is thus 2.3.

The units of group work display greater variability than those of S work and the chances are 99 in 100 that the difference is *not* due to mere chance.

Previous investigations have shown that variability of an individual increases under fatigue (Yule, Weinland). Since the work for group is the result of a weaker motive, it tends to resemble work under fatigue.

In fact, school W, the only one in which the variability of the group units was lower than that of the self units, ranked highest in coöperativeness. Their speed of group work almost equals that of self work. Increased variability, then, seems to go with lesser motivation.

B. Choosing to Work for Self or Group

The Choice test was given immediately after the alternating Efficiency tests. A child was to choose whether to continue working for self to increase his own score (S), or to work for the group to increase the group score (G). This opportunity was repeated seven times. The average number of choices made to work for self and for group is presented in Table 14.

TABLE 14

Choice Under Self and Group Motivation

School	N	S	G	S–G	σ	V	% S	% G	Diff.
L	311	4.86	2.14	2.72	1.98	70	69	31	38
E	218	5.70	1.30	4.40	1.66	78	81	19	62
W	279	4.77	2.23	2.54	2.10	78	68	32	36
Total.....	808	5.18	1.82	3.36	1.97	75	74	26	48

Columns S, G, and S–G show the average number of choices made to work for self or for group, and the difference between them. Column σ gives the standard deviations of the distribution of choices, and V gives the coefficients of variation.[3]

[3] G + S was a constant — 7, and, therefore, the r S, G = — 1. The $\sigma S = \sigma G$, and $\sigma(S - G) = 2\sigma S = 2\sigma G$.

Columns %S and %G and Diff. give the data of columns S and G and S–G in terms of percentage of the total (7).

The average number of choices to work for self was about three times as large as that of working for the group. (The latter was chosen about once in 4 times.) There were, however, marked individual differences ranging from some who chose 100 per cent to work for themselves to those who made 100 per cent choices to work for the group.

Analysis of Choice

Effect of Time upon the Nature of Choice

The opportunity to work either for self or for group was presented seven times. In order to ascertain the effect of time and repetition we computed the percentage of pupils choosing to work for the group during each of the seven opportunities.[4]

TABLE 15

Percentage of Choices to Work for Self and for Group During Each of Seven Units of Choice

Units	1	2	3	4	5	6	7
S	84.4	61.6	69.6	66.0	67.0	64.8	71.9
G	15.6	38.4	30.4	34.0	33.0	35.2	28.1

Table 15 reveals two facts:

1. A larger per cent of children chose to work for self rather than for the group during each one of the seven units of choice.

2. The excess of choice in favor of self rises and falls rather rhythmically. It is greater in the odd units (1, 3, 5, 7) and smaller in the even units (2, 4, 6).

A review of the directions given may offer some explanation of the latter phenomenon. The mention of self and class in the directions of choice were alternated. In the odd units self was mentioned first: "You may work either for yourself or for your class." And in the even units group was mentioned first.

[4] This percentage of choice, of course, corresponds to the percentage of children. In the first opportunity to choose between self and group, 126 of the 808 children had chosen to work for the group and 682 had chosen to work for self. This means that in 84.4 per cent of the 808 acts of choice, self was chosen, and in 15.6 per cent of the choices class was chosen.

It is noteworthy that so subtle a difference in direction acted as a force of suggestion, on some children at least, to respond to one rather than to the other motive.

This fluctuation of percentages in the odd and even units obscures the general association between choice and time, or repetition of opportunities. To eliminate this complication, the percentages were obtained for each successive pair of choices. Each percentage is the average of two adjoining units. It may be observed from the table that the response to the first unit differed radically from the others, consistently inducing a very large percentage of children to work for self. It was therefore considered unwarranted to average it with the unit following. The units paired for averages were, therefore, 2 and 3, 4 and 5, 6 and 7. The results are presented in Table 16.

TABLE 16

PERCENTAGE CHOOSING TO WORK FOR SELF AND GROUP IN EACH OF THE THREE PAIRS OF CHOICE UNITS

	MOTIVE	1	2	3
808	Self	65.6	66.5	68.3
	Group	34.4	33.5	31.7

This table reveals a decrease of the percentage of children choosing to work for the group with the progress of choice. The first pair of units have the largest percentage and the last pair the smallest percentage working for the group.

This tendency, the decrease in appeal of working for the group, is very similar to the one noted above in the results of the Efficiency tests. There, too, as the test progressed, the work for the group decreased consistently in speed while in work for self the speed increased.

Speed of Work Under Free Choice

The records of the actual amount of work done in work for group and for self were available. Table 17 presents the results.

Columns Se and Ge present the efficiency (speed per minute) of work for self and for group, respectively, column D gives their difference, and columns Su and Gu the number of units worked for self and for group. The columns S Work and G Work give

TABLE 17

SPEED OF WORK UNDER FREE CHOICE

SCHOOL	N	Su	Se	Gu	Ge	D	S WORK	G WORK	$\frac{G}{G+S}$
L	311	4.86	57.2	2.14	47.0	10.2	278.0	100.6	.266
E	218	5.70	32.8	1.30	28.9	3.9	186.8	37.6	.126
W	279	4.77	45.5	2.23	40.1	5.4	217.0	89.4	.292
Total.....	808	5.18	45.9	1.82	39.5	6.4	237.8	71.9	.232

the actual amount of work done per child for self and for group during the 7 minutes of free choice, and column G/G + S gives the percentage of the total work done for the group.

An interesting population difference is revealed. The children of school E (high social status) were superior to the other two schools in the efficiency of work for the group on those tests which they had chosen to work for the group, but inferior as far as the number of choices is concerned. Their G–S score as seen from Table 17 is smallest. The G–S of school L is largest, although they contributed the greatest number of units to their group. Apparently the children of school L selected the poorer samples of their work to give to their group, while the children of schools E and W worked on the units chosen for their group at a speed only a little lower than the speed at which they worked for themselves.

Speed of Work and the Progress of the Choice Tests. Table 18 presents the average speed of work during the six units [5] of the choice tests of those choosing to work for self and those choosing to work for the group.

TABLE 18

SPEED OF THOSE WORKING FOR SELF AND THOSE WORKING FOR GROUP ON SIX SUCCESSIVE UNITS OF CHOICE

TEST	1	2	3	4	5	6
Self	51.2	48.6	46.9	45.7	46.1	47.5
Group	42.7	41.6	40.0	40.6	39.8	39.1
Diff.	—8.5	—7.0	—6.9	—5.1	—6.3	—8.4

[5] The last unit of choice was not included because it involved the giving away to the group a unit of work previously done as practice. See Test Directions in the Appendix.

Table 18 indicates that:

1. In each unit of choice the work for self is at a higher efficiency.

2. There is a slight but consistent decrease of the successive differences in speed during the first four units, followed by a definite increase in the last two units.

Summary

The efficiency of work for self was definitely higher than that of work for the group. The average child did 32.4 examples less in the 12 minutes of group work than in the 12 minutes of self work. The difference between the two means of speed was thus 2.7 examples per minute.

The difference is highly reliable for it is 13.2 times its own standard deviation. Allowing for all chance variations we may be practically certain of a difference of 24.8 examples on the whole test or a difference of at least 2.1 examples per minute in favor of work for self.

A comparison of the curves of work under the two forms of motivation indicates that the curve of self work goes up, and the curve of group work goes definitely down, with the progress of work. The difference between the two increases consistently throughout the testing period. It follows that work for self evokes greater persistence and is less affected by fatigue.

Either of the two forms of motivation was found to produce an increase in speed above the level of unmotivated or practice work. Personal motivation brought about a higher increase in speed. If we take the latter increment (self-practice) as the standard of motivation M, we find that social motivation produced an increment only .45 of M.

The correlation between self and group work decreases also with the progress of the work units. From the first third to the last third of the test the correlation drops from .94 to .81.

A comparison of the first and second minutes of work within each of the twelve test units shows a universal tendency of speed to drop. The speed of the "first" minutes of group work is equal to the speed of the "second" minutes of self work.

There is no difference in variation between individuals in the two sets of speed. The variation, however, increases with the

progress of work and the increase of variation in group work is larger than that of self work.

Group work shows greater unevenness or variability from minute to minute throughout the test period.

Choice. When opportunities are presented to continue working either for self or for group the former is chosen about three times as often as the latter. Of seven choices the average number of choices to work for group was 1.82 (26 per cent) and for self it was 5.18 (74 per cent). The difference in choice rose and fell with the progress of the seven opportunities. The general tendency was to choose *less* often to work for the group. The speed of work on the choices for group was consistently lower than on the units chosen to work for self.

On practically every aspect of measurement the motive of cooperation with one's group was less effective than the motive of competition for personal gain.

CHAPTER IV

RESULTS (*Continued*)

A Measure of Coöperativeness

The data presented in Chapter III showed that the motive of competition for a personal gain was definitely stronger than the motive of participation in a group project. The lesser intensity of the group motive was determined by three different measures:

A. The general speed of work for the group was markedly lower than the speed of work for self.

B. Continued work and fatigue affected the efficiency of work for the group to a much greater extent than in the case of work for self.

C. When opportunities were offered to work either for self or for group the choices in favor of self were 3 times as frequent as the choice to work for the group.

This superiority of the motive of self, however, holds true only if we consider the means of schools or total population. When the scores of single cases are considered marked individual differences appear. There were, for instance, children who worked for the group at a *higher speed* than for themselves; there were some who worked for the group *more persistently* than for themselves; and some who chose *more frequently* to work for the group than to work for themselves.

This chapter will present the data concerning the individual differences in each of the above-mentioned scores.

The Efficiency Test

Two scores of speed were available for each child. A score of his work for self and another score of his work for the group. Each one of these scores was the average of twelve minute-units of work. In order to determine the relationship between the two individual scores it was necessary to express them either

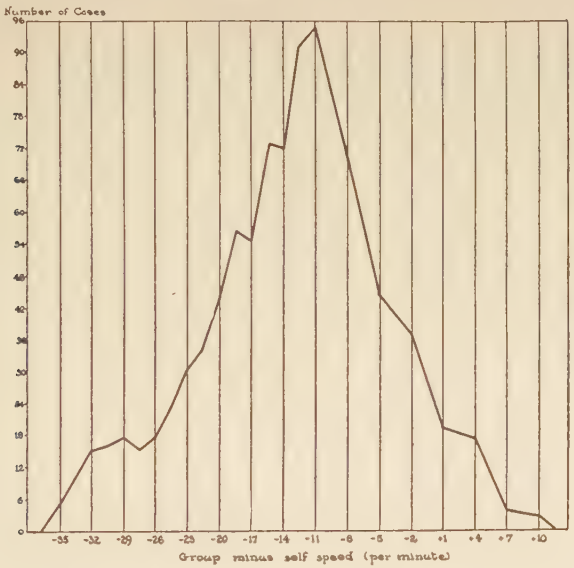
as a difference or as a ratio. The difference was chosen because of two considerations:

1. The distribution of differences showed greater normality than that of the ratios.
2. The self correlation of two sets of differences was found to be higher than the one between two sets of ratios.

The difference between the two speeds was then found for each child. The distribution of these differences for our main population is presented in Figure III (814 cases).

FIGURE III

FREQUENCY DISTRIBUTION OF SCORES ON THE EFFICIENCY COÖPERATION TEST



It is noted from Figure III that the differences G-S range from — 35 to + 10 with a mean difference of — 2.7, in favor of self speed.

Reliability of Scores

That these differences are not simply the result of chance fluctuations was demonstrated before when the significance of the difference was shown. For the mean of these differences is identical with the difference between the means of Chapter III.

If these differences were results of chance their average should have been zero or within its probable error. In reality this difference was 13.2 its standard deviation, or 19.6 times its probable error.

This, however, does not indicate the reliability of individual scores. This reliability was determined by correlating two halves of the test. As there were 12 units of self work and 12 units of group work, it was possible to get two sets of differences, the even S scores minus the even G scores and the odd S scores minus the odd G scores. These two sets of scores were then correlated. The correlations were computed separately for three schools and the total population.[1] They are shown in Table 19.

TABLE 19

SELF CORRELATIONS OF EFFICIENCY TEST

SCHOOL	NO.	$r\ h_1h_2$	P.E.	r TOTAL	P.E.
L	265	.7363	.02	.8481	.01
E	211	.6313	.03	.7740	.02
W	294	.5876	.03	.7402	.02
Total	770	.6989	.01	.8228	.01

The correlation between half and half of this score was .70. The self correlation of the total by the Spearman-Brown formula was .82. $\left(r\ total = \frac{2rh_1, h_2}{1 + rh_1, h_2}\right)$.

A Measure of Coöperativeness

These correlations indicate a fair degree of reliability. The test then succeeded in isolating reliable individual differences in respect to the *relative* strength of personal and social motivation. It measured a variable from which these individual differences were distributed on a continuous scale approximating a normal distribution. This variable might be called either selfishness or, by reversing the sign, coöperativeness. The latter was chosen because of its positive character.

[1] The correlation between the 2 sets of differences was found in terms of the six intercorrelations. The formula for it as derived by Spearman [120] is

$$r(1\text{-}2)\ (3\text{-}4) = \frac{r_{13}\sigma_1\sigma_3 + r_{24}\sigma_2\sigma_4 - r_{14}\sigma_1\sigma_4 - r_{23}\sigma_2\sigma_3}{\sqrt{\sigma_1^2 + \sigma_2^2 - 2r_{12}\sigma_1\sigma_2}\ \sqrt{\sigma_3^2 + \sigma_4^2 + 2r_{34}\sigma_3\sigma_4}}$$

These scores of coöperativeness (G-S) ranged from + 10 the most coöperative, to — 35 the least coöperative. To avoid the use of minus signs (see Table 3) each score was added to 100. The final scores then ranged from 65 to 110 with a mean of 97.3 and a σ of 6.1. The means of schools L, E, and W were 95.5, 97.4, and 99.0, respectively.

It will be noted that the scale extends about three times as much in the negative as in the positive direction. The central tendency of the differences was not zero but definitely negative. Again, there were definitely more children with a negative than a positive score.

For convenience, we may divide the scale into three sections:

1. Above zero—definitely coöperative.
2. From the mean (— 2.7) to the zero point—relatively coöperative, smaller discrepancy than the average.
3. Larger negative than the average—uncoöperative.

Table 20 presents the number and percentage of children falling into each of those three groups.

TABLE 20

NUMBER AND PERCENTAGE OF THREE GROUPS OF CHILDREN DIVIDED ON THE BASIS OF THE DIFFERENCE BETWEEN GROUP AND SELF SPEED

DIFFERENCE	MARKEDLY NEGATIVE		SLIGHTLY NEGATIVE		POSITIVE	
School	No.	Per Cent	No.	Per Cent	No.	Per Cent
L	167	53	52	17	94	30
E	94	43	61	28	63	29
W	63	23	86	31	129	46
Total	324	40	199	25	286	35

A Scale of Coöperativeness

It was shown before that the difference between S and G work increased and coöperativeness thus decreased with the progress of the tests.

In a sense, then, the series of alternating self and group tests may be considered as a scale of coöperativeness ascending in difficulty. If this scale were perfect, it should hold true for any given individual. A child who was coöperative on *any one* unit of the series of tests should have been coöperative on *all* the preceding test units, and conversely, a child who was not co-

operative on any one test should be uncoöperative on all the tests that followed. The same would apply to the group means of the series of tests.

Such analysis was made of the means of twenty-one groups.

The G-S differences of each group were divided into three groups, those of the initial period, the middle, and the final period. Each difference was scored on a scale of 5, + 2 if the G score is markedly higher than the S score, + 1 if it is slightly higher, 0 if the two are equal, — 1 if S is slightly higher, — 2 if S is markedly higher.

TABLE 21

COÖPERATIVENESS DURING *Three* STAGES OF TESTING

GROUP	1	2	3	4	5	6	7	8	9	10	11
Testing Period											
I	—2	0	—2	—2	—1	—2	0	—1	—2	0	—2
II	—2	—1	—2	—2	—1	—2	—1	—1	—2	—2	—2
III	—2	—1	—2	—2	—2	—2	—2	—2	—2	—2	—2

GROUP	12	13	14	15	16	17	18	19	20	21
Testing Period										
I	—2	1	1	0	2	0	0	—1	0	0
II	—2	0	1	—1	0	—1	—2	—1	—2	0
III	—2	—1	0	—2	—1	—1	—2	—2	—2	—1

Table 21 presents the results of the scale for twenty-one classrooms. It reads as follows:

Group 1 was uncoöperative in each of the three periods, group 2 was neutral (G = S) during the initial period, and slightly uncoöperative during the middle and final periods, etc.

It will be noted that the scale holds true for each of the twenty-one groups. The degree of coöperation at any given period was never higher than at the preceding period and never lower than during the subsequent period. In no case did cooperation increase. It either remained constant or decreased.

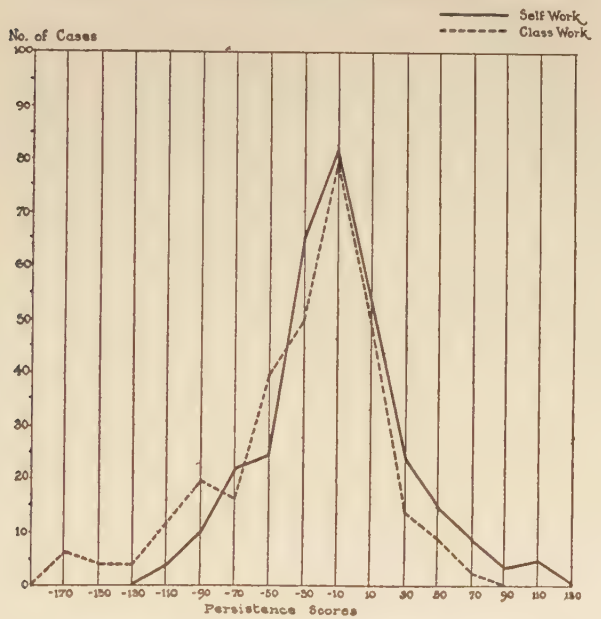
PERSISTENCE

The difference between the initial and final four-minute periods of work was taken as a score of persistence. The average persistence score in work for self was + 2.0 and the average per-

sistence in work for group was — 11.8. This difference is 5.1 times the S.D. of the difference. The efficiency in self work after a period of twenty minutes of continuous work was higher than during the initial period of work, while in the case of work for the group the efficiency dropped markedly.

FIGURE IV

FREQUENCY DISTRIBUTION OF PERSISTENCE SCORES



There were, however, large individual differences with respect to persistence. The range in work for self was from — 110 to + 110 and in work for group it was from — 170 to + 70.

The distributions of the two sets of persistence scores are presented in Figure IV.

The Reliability of the Persistence Scores

Each of the persistence scores was the difference in speed between the first four and last four minutes of work. It was then possible to break up the difference into two sets of scores, each being the difference between two initial and two final minutes of work. These two sets of differences were then correlated. The correlation for the persistence in self work was

.79, and for the persistence in group work it was .85. The reliability r's of the two total persistence scores were then .88 and .92, respectively.

The Free Choice Test

The averages for this test as shown in Chapter III indicate that when opportunities are presented to work either for self or for the group the former will be chosen about three times as frequently as the latter (see Table 14). There were again individual differences extending over the complete range of the scale. There were some who chose 100 per cent to work for self and others who chose 100 per cent to work for group. The distribution of individual scores is rather normal if we exclude those who gave nothing to their group. The latter form a large group at the lower end of the distribution. This may be the result of the coarseness of the measuring instrument.

The difference between giving nothing and giving one unit out of seven (14 per cent) is probably too large and too coarse to discriminate between individuals. Had the unit been finer, had the number of opportunities been much larger, many of those who cluster at zero would have probably attained varying degrees of scores. The difference between giving nothing and giving one is probably much larger than between giving one and giving two units to the group. All those who made a score of less than one were thus forced into the zero group. This resulted in a distribution skewed to the right.

A Score of Coöperativeness

The number of units a child gave away to his group was then taken as a score of coöperativeness. It will be recalled from the description of the technique that any unit given to the group on this test meant that much of a loss to the individual on his self score. The overt conflict between self and group interests involved in this test was not present in the Efficiency test where a child could go on working at top speed for his group without affecting his score for self. In a sense, the type of coöperation involved in the Choice test is coöperation through giving, while the type involved in the Efficiency test is coöperation through doing.

In order to establish the reliability of the choice it was necessary to repeat the test on another occasion. This test was given

twice to four groups (118 cases), with an interval of three days between the first and the second testing. The two sets of scores were then correlated. The correlation was .88 ± .01.

Three Degrees of Choice

The range of responses to this test can be divided into three parts.

A. Those choosing to work for themselves in each of the seven opportunities.
B. Those sharing their work with the group, working on some units for themselves and on others for the group.
C. Those choosing to work for the group on each of the seven test units.

TABLE 22

NUMBER AND PERCENTAGES OF CHILDREN IN EACH OF THREE GROUPS OF CHOOSERS

SCHOOL	ALL FOR SELF		SHARING		ALL FOR GROUP	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
L	75	24	221	71	15	5
E	72	33	144	66	2	1
W	75	27	184	66	20	7
Total	222	27	549	68	37	5

TABLE 23

TOTAL COÖPERATION SCORES OF THREE POPULATIONS

SCHOOL	TOTAL		BOYS		GIRLS	
	N	Med.	N	Med.	N	Med.
L	313	101.2	163	100.7	150	101.9
E	221	100.6	114	100.3	107	100.9
W	279	103.1	141	103.7	138	102.5
Total	813	101.9	418	101.8	395	101.9

TOTAL COÖPERATION SCORE

The scores on the Efficiency and Free Choice tests were combined into one total coöperation score, giving the Efficiency score a weight of 3 and the Free Choice a weight of 2. As the S.D. of the former was about three times the S.D. of the latter, the

total score was simply the Efficiency score plus twice the Free Choice score. Table 23 presents the averages.

Summary

Two scores of coöperativeness were obtained for each child:

A. The difference in speed between his work for himself and work for his group, each score being the average of 12 minutes' work.
B. The number of times he had chosen to work for his group [or to give his work to the group] of a total of seven units of choice.

The distributions of each of these sets of scores approximate normality. The individual differences ranged from those who were definitely competitive rather than coöperative to those who were coöperative rather than competitive. The central tendency was in the direction of competitiveness.

The scores of coöperativeness had high enough self correlations to consider individual measurements reliable. The self-r of the Efficiency test was .82 and that of the Free Choice test, .88.

The two measures of coöperativeness have a low intercorrelation (.23). The two seem to measure specific aspects of cooperative behavior. The Efficiency test involves the aspect of *working* persistently for the good of the group, while the Free Choice test involves the *giving* of time or work done to the group.

It was shown that the progress of work or repetition of the tests results in constantly decreasing coöperativeness. The Efficiency test in which the motives of self and group are alternated resulted in a scale of coöperativeness. One who was "cooperative" on any given unit tended to be coöperative on all the preceding units, while the one who was uncoöperative on any one unit was uncoöperative on all the succeeding units.

A measure of persistence in work for self and group was obtained by taking the difference in speed between the first and last third of the testing period.

The two measures of coöperativeness were combined into one total coöperation score. In view of the relatively high self correlation of each of the tests and the low intercorrelation of the two, the total score approaches a measure of coöperativeness not restricted to a single aspect of the variable.

CHAPTER V

VALIDITY

In a test of behavior the problem of validity is of less significance than in the case of a so-called general test. By the very definition of the term "behavior test" we understand that a given pattern of response is itself the object of measurement. A response of coöperativeness under given conditions is evidence of coöperativeness in that specific situation. It differs in this respect from the ordinary test in which the real object of the testing is not the actual response but the total pattern of which the test is a supposed sample.[1]

The main problem is, then, to determine whether that response is typical of the subject in question, and whether such an identical response will be evoked again if the test is repeated under identical conditions. But this is really a problem of reliability. The ideal index of reliability to be obtained from any set of scores is its correlation with the true measure or with an infinite number of repetitions of the given measure. The highest coefficient of reliability to be expected is the square root of the reliability (of the total measures) actually found. That correlation may be looked upon as the theoretical coefficient of validity: r validity $= \sqrt{\frac{Nr}{1 + (N-1)r}}$ where N is the number of *measures* taken, r is the correlation actually obtained between one half and another of those measures, and $\frac{Nr}{1 + (N-1)r}$ is the reliability of the total number of measures.

In our case, then, where the reliability of the Efficiency test was .82 and that of the Free Choice was .88, their respective theoretical validities would be $\sqrt{.82} = .91$ and $\sqrt{.88} = .94$.[2]

The score on a standardized behavior test is a measure of an

[1] It would be advisable to call the former, "measure" in distinction to "test," e.g., we measure speed but we test intelligence.

[2] See Hartshorne, H. and May, M., *Studies in Deceit*, II, Chap. VII; and Kelley, T., *Statistical Method*, pp. 199-201.

established conduct pattern. The value of such a score increases with the extent to which the specific response measured is typical of other ones and is associated with them. The realm of prediction is then enlarged.

It is of primary importance, then, to know the degree to which coöperation of the sort involved in the Efficiency and Free Choice tests (the group-loyalty type of behavior) correlates with other scores which could be used as measures of coöperativeness and with general criteria of it.

The Character Education Inquiry had administered a number of tests of helpfulness and also succeeded in having each child rated on helpfulness by his teachers and classmates. Specified rating was done, in addition, on one of our populations by a psychologist who came in close contact with the children tested. The relationship between our tests and these measures was studied.

General Ratings

Classmates

The Character Education Inquiry has devised a scheme by which classmates rate one another on various aspects of character. A series of word pictures are presented to the children and they are to write after each description the *name* or *names* of the children whom the word picture fits. The following items dealt with social behavior:

1. "Here is someone who is always ready to play or work with the rest even when he (or she) can't have his own way."
2. "This is a jolly good fellow—friends with everyone, no matter who they are."
3. "This one is always picking on others and annoying them."
4. "Here is someone who is kind to younger children, helps them on with their wraps, helps them across the street, etc."
5. "Here is someone who will always stop what he is doing to help a fellow pupil. This person is never too busy to lend a hand when someone is in trouble."
6. "This one would never go out of his way to help anyone or take any trouble to be of use to others."
7. "Here is a crabber and knocker. Nothing is right. Always kicking and complaining."
8. "Here is someone who is always doing little things to make others happy."
9. "Here is a very selfish person who will not share anything. He always wants to know what he can get for himself, and never thinks of others."

10. "This one is always trying to get by with the least possible effort and trouble to himself." [3]

It is evident that these items portray different angles of social or anti-social conduct. Each positive item had a score of + 1 and each negative item had a score of — 1. The total score based on those items was thus a measure of the extent to which a child was considered social by his classmates. The correlations between this score and coöperation on the Efficiency and Free Choice tests are presented in Table 24.

Teachers' Ratings

Instead of asking the teachers to rank the children on a scale of 5, the Character Education Inquiry has prepared a rating form in which the variable is already graded in five steps from positive through zero to negative. Considering the behavior of each child, the teacher is to check the step which fits him most. The following scales were used for rating on coöperativeness: [3]

COÖPERATION

Works with others if asked to do so. (+ 1)
Works better alone; cannot get along well with others. (— 1)
Works well and gladly with others. (+ 2)
Indifferent as to whether or not he works with others. (0)
Usually antagonistic or obstructive to joint effort. (— 2)

SELFISHNESS

Self always first. (— 2)
Others first, only under pressure. (— 1)
Others first if to his own advantage. (0)
Thinks of others first; little thought of self. (+ 2)
Self and others on equal basis. (+ 1)

The score on this rating scheme ranged from — 4 to + 4. The correlations between this score of reputation and coöperation on our tests are given in Table 24.

Check List

A list of descriptive words was given to the teachers. They were to check the words that are descriptive of each child. Twenty-five of those words were descriptive of social behavior. The words of positive quality were: [3]

coöperative, obliging, thoughtful, social minded, kind, considerate, generous, sociable, unselfish, merciful, humane, compassionate, public-spirited, charitable.

[3] Quoted by permission from the rating scales of the Character Education Inquiry.

The negative words were:

selfish, uncoöperative, stingy, quarrelsome, cruel, inconsiderate, a bully, callous, brutal, shirker, greedy.

The scores ranged from negative (— 11) through zero to positive (+ 14), depending upon the number of words checked and their nature. The correlations between this score and the scores on our tests are given in Table 24.

Total Rating

The above three ratings were combined into one helpfulness reputation score. The correlations between this score and cooperativeness on the Free Choice and Efficiency tests are presented in Table 24.

TABLE 24

CORRELATIONS BETWEEN SCORES ON TESTS AND RATINGS ON GENERAL COÖPERATIVENESS

	EFFICIENCY TEST			FREE CHOICE TEST		
	N	*r*	±	N	*r*	±
Rating by Classmates...	752	.37	.02	748	.25	.02
Rating by Teachers A..	621	.28	.02	610	.18	.03
Rating by Teachers B..	702	.25	.02	697	.13	.03
Combination	619	.30	.02	608	.27	.03

Each of the above correlations between tests and ratings would be a true index of the association between the two variables if each of the measures were true scores without any errors of measurement. That such chance errors lower the correlations has been demonstrated by Spearman and others [120].

The correction for attenuation gives the r to be expected if the sets of measures were freed from those errors. It is the ratio of the inter r's to the square root of the self r's.

That is, true r A, B $= \dfrac{r\,\mathrm{A, B}}{\sqrt{(r\,\mathrm{A_1, A_2})\,(r\,\mathrm{B_1, B_2})}}$

The self r of the Efficiency test was .82 and that of the Free Choice test was .88. The reliability of the total reputation score is given by Character Education Inquiry as .56. The true correlation between the Efficiency test and total reputation becomes then $\dfrac{.30}{\sqrt{.56 \times .82}} = .44.$

Similarly for the Free Choice test the correlation with the total reputation is $\frac{.27}{\sqrt{.56 \times .88}} = .38$. The self correlation of the Total Coöperation Score was .866, and its correlation with the Criterion was .350. Correcting the latter for attenuation, we have $\frac{.350}{\sqrt{.560 \times .866}} = .504$, which may be taken as the true correlation between our total test score and this criterion.[4]

Analysis of the Relationship Between Coöperation on Our Tests and General Reputation of Coöperativeness

The range of scores on the total helpfulness reputation was from -44 to $+40$. But the interquartile range was from zero to $+9$. The distribution was skewed to the left. Fifty per cent of cases were distributed over only 11 per cent of the total scale. This is less than half of the range included by the middle $\pm Q$ of a normal distribution which covers about 25 per cent of the total scale. There was thus a tendency on the side of the classmates and teachers in their rating to consider as "average" more than twice as many as would be found in a normal distribution.[5]

If we assume that a *true* measure of children's coöperativeness would result in a normal distribution, the leptokurtosis in our distribution may be due to the following considerations:

1. Lack of evidence: The raters who have not sufficient evidence upon which to base either a favorable or an unfavorable opinion about many of the subjects to be rated tend to rate them as "average" or slightly above average. These cases are evidently not measured at all and are thus pure guesses or chance errors.

2. Contradictory evidence: The rater recalls repeated identical situations in some of which the subject under consideration behaved in a coöperative manner, and in others in a selfish

[4] If we use in the last equation the intercorrelation between our two scores, the r with reputation becomes $\sqrt{\frac{.35}{.56 \times .23}} = .97$. This might be taken as the theoretical correlation between reputation and that aspect of coöperation which is common to both the Efficiency and Free Choice tests.

[5] The skewness of our distribution was tested by the formula $SK = P_{.50} - \frac{1}{2}(P_{.90} + P_{.10})$. In a symmetrical distribution this is equal to zero, but in our distribution SK was significantly negative. The test for leptokurtosis was the formula $K_u = \frac{Q}{P_{.90} - P_{.10}}$. In our distribution K_u was significantly smaller than .26315. The latter holds true for mesokurtic distributions. [77]

manner. Such actual change of behavior may be the result of learning, or of the lack of an integrated behavior pattern. Vacillations, such as these, are not infrequent, though more typical of some individuals than of others. The opinion is then an unwarranted "average" of good and bad impressions.

3. Apparently contradictory evidence: The rater having in mind a general pattern of helpfulness may recall different situations involving helpfulness in which the subject has behaved in contrasting manner. Those situations, however, may have actually differed from one another in the kind of helpfulness they involved. The rating given as "average" is again unjustified.

Any of these considerations might have moved the rater to consider the subject as "average." This large group of average children may be in reality distributed over the complete range on any test of coöperation. The resulting correlation would naturally be low. The true relationship between test score and reputation is thus to be sought in a comparison of test score and reputation score of those who were rated as definitely cooperative or as definitely selfish. For only these are really measured by the reputation scores.

The total population for whom scores were available on our coöperation tests and on the total reputation consisted of 684 children. These were divided into three groups on the basis of the reputation scores: the interquartile range, the upper quartile (positive reputation in coöperation), and the lower quartile (negative reputation in coöperation). The scores of each of these groups on our tests were then studied.

Of all the cases falling in the upper quartile on reputation there were only *two* (less than one per cent) whose score on the Efficiency test was in the lower quartile. (There should have been 25 per cent if the two variables were unrelated.) Seventy-seven per cent of them coöperated on the Free Choice test. Of all the cases falling in the lower quartile on reputation, less than 8 per cent were in the upper quartile on the Efficiency test. Forty per cent of them scored zero on the Free Choice test.

Again on the Efficiency test 25 cases scored as extremely cooperative. Their efficiency in work for the group was significantly greater than that of their work for themselves. Of

these 25 cases there was only a single case in the lower quartile of the total reputation scores. On the other hand, there were 35 cases with very low coöperation scores. Their Efficiency in group work was far below that of their own work. Of these there were less than 3 per cent in the upper quartile on the reputation score.

Specified Rating by a Psychologist

In one of the schools, W, there was present a psychologist who came in close and intimate contact with the great majority of the 280 children tested. He was therefore asked to state his opinion concerning each of the children with regard to (1) co-operation of the Efficiency type; (2) self-sacrifice of the Free Choice type.

The specific directions to the rater were as follows:

1. Rank *S*, those children who would work for self better; rank *C*, those who would work for class better, in tests involving work for self and for class.

2. Rank *S*, those children who would not give any units to their class if it were to their personal advantage to keep those units for themselves; rank *C*, those who would give away all or nearly all units to their class.

Consider in your ranking all data and information that you may have about each child for situations similar to these described.

Consult the *teachers* and *companions* of last year (when testing was done) and of this year.

Reliability of the Psychologist's Rankings

The ranking was done on two occasions. It was therefore possible to find the reliability of each of the above rankings. As the ranking in each case was either plus or minus, the correlation was found by fourfold tables. The self-r of the ranking on the Efficiency type of behavior was .62. For the Free Choice type the self-r was .67.

Correlation with Criterion

The correlation between Efficiency test and Efficiency rating was .49. For the Free Choice this correlation was .56. Corrected for attenuation, these correlations become .65 and .73 for Efficiency and Free Choice, respectively. These correlations are definitely higher than those with ratings on general co-operativeness. They indicate, however, that even when the rating is so specific the correspondence is far from unity. This

may be due to: (1) The difficulty of observing a behavior pattern; (2) the probable absence of such patterns in many of the children tested.

Tests of Helpful Behavior

The scores on three tests of helpfulness were available. These tests of the Character Education Inquiry were as follows:

The Kits Test

Kits containing ten school articles each, such as drinking cup, pencil sharpener, etc., were given to each member of the class as a present from a friend of the school. An appeal was then made to send these articles away to poor children who do not possess them. A child was given the opportunity to give away in an inconspicuous manner any part, all, or none of the articles received. The amount given was checked up without the child's knowledge. Appropriate score values were ascribed to each of the articles given away. This was administered to our whole major population, 812 children.

The Envelope Test

Each child was provided with a letter in which an appeal was made for pictures and jokes which were to be put in booklets for children in hospitals. Four envelopes were given out in which a child was to place jokes, puzzles, stories, and pictures, respectively. The children were allowed ten days to bring in their contributions during which period the teacher mentioned the matter three times. The great variety of things handed in were given score values from which a score of helpfulness was obtained for each child.

Table 25 shows the correlation between each of these tests of helpfulness with the Free Choice and Efficiency tests.

A Vote Involving Helpfulness

A vote was taken at the end of a spelling contest. The question placed before the children concerned the way of spending the anticipated prize money. The following form was used for the vote.

Write your name on the slip and then mark 1 what you would most like to do with the money. Mark 2 your second choice. Mark 3 your third choice. Mark 4 your fourth choice. Mark 5 your fifth choice.

A.....Give all the money to the boy or girl scoring highest in the test.
B.....Buy something for our school, such as bats, balls, skipping ropes, a picture.
C.....Buy something for the room, such as a picture, a globe of goldfish, a plant.
D.....Divide the money equally among the members of the class.
E.....Buy something for some hospital child or some family needing help or some other philanthropy.[6]

The five votes were ranked by a number of educators according to the degree of charitableness they involved.

The order of preference was E, B, C, A, D. A child who marked E as his first choice, B as the second, C as third, A as fourth, and D as fifth choice thus had the highest score (10). Similarly any vote was scored on the basis of the child's deviations from the above order.

The correlations between the score on the vote and the score on the Efficiency Coöperation test and the correlation with the Free Choice test are shown in Table 25.

TABLE 25

CORRELATIONS WITH TEST OF HELPFULNESS

	EFFICIENCY			FREE CHOICE		
	N	*r*	±	N	*r*	±
Kits Test	715	.32	.02	706	.13	.02
Envelopes Test	625	.21	.03	611	.20	.03
Vote	748	.27	.02	736	.17	.02
Combination	619	.41	.02	612	.28	.03

Analysis of the Relationship Between the Vote of Helpfulness and Scores on Our Tests

The vote was scored on the basis of charitableness. For that reason item E was given the highest and D the lowest value. Our tests measured the extent of class loyalty and coöperativeness for the purpose of a group gain. The two variables have therefore little correspondence. It is of interest to compare the means of the five groups of children who took each of the five responses as their *first* choice.

The third, fourth, and fifth columns of Table 26 give the medians on the Efficiency test and on the Free Choice test,

[6] Quoted by permission of the Character Education Inquiry.

TABLE 26

COÖPERATIVENESS OF FIVE GROUPS OF VOTERS

VOTE	N	EFFICIENCY	FREE CHOICE	PER CENT COÖPERATION	CRITERION	SPEED
A	29	96.9	1.5	64	0.5	55.0
B	16	96.7	2.6	69	3.5	51.7
C	38	97.4	2.6	97	7.7	53.8
D	122	97.1	2.1	67	4.6	53.0
E	80	97.6	3.1	96	6.0	57.9

and the percentage coöperation on the latter test of each group of voters. The sixth column gives the median criterion score of coöperativeness of each group. The last column gives the speed of work of each group. The table indicates the following:

1. Those who voted that the prize be spent in buying something for the classroom (C) had the highest percentage cooperating on the Free Choice test. Their mean score on the Free Choice test and on the Efficiency test was next to the highest. The highest score on each one of the tests was made by the group who voted the prize be spent on charity (E). Those who wanted the prize to be given to the one achieving the highest score (A) had the lowest per cent coöperating, the lowest mean on the Free Choice, and next to the lowest in Efficiency. Those who wanted the prize divided equally (D) were second lowest in percentage coöperating and in mean Free Choice.

2. Those who voted the prize be spent on the classroom had the highest coöperation criterion score. They were ranked highest in coöperation by their teachers and classmates. Those who wanted the prize given to the one scoring highest had the lowest criterion score.

3. It is somewhat surprising to note that the charity group (E) had the highest score in speed of work. This, however, is probably the result of the fact that more girls than boys fell in this group and the girls generally showed a greater speed in their work. Those who voted A were second to highest in speed and those who voted D (equally divided) were second to lowest in speed.

4. The percentage of girls was larger in the groups voting

the prize be given to a hospital or for other charity and in the group voting that it be given to the child having the highest score in spelling. (It should be noted that the girls' scores in spelling were generally higher than those of the boys.) The girls were less well represented in the groups voting that the prize be equally divided.

5. More than three times as many voted that the prize be equally divided as those who voted that it be spent on the classroom. It is, therefore, not surprising that the actual choices to work for self were about three times the choices to work for the group on the Free Choice test, and that only about one-third of the children worked as efficiently for their group as they worked for themselves.

Summary

The reliability of our tests may, in a sense, be taken as an index of validity. This theoretical validity is rather high: .91 and .94 for the Efficiency test and Free Choice test, respectively.

Our scores correlate highest with specified rating, in which the rater is informed of the nature of the test and asked to rate the children on that pattern of behavior (r's = .65 and .73). Lower in order are the correlations with general ratings on helpfulness by classmates and teachers (r's = .42 and .38). Slightly lower are the correlations with the composite of other objective tests involving helpfulness (r's = .41 and .28).

The correlations are low and indicate a high degree of specificity of behavior. From these scores of coöperations one could hardly predict a given child's reputation of helpfulness or his behavior on a different test involving self–others relationship.

The correlations, however, are all many times larger than their respective probable errors. They indicate that coöperativeness in specific situations, as those of our tests, are associated to some degree with coöperativeness in other specific situations, totally different in nature, and also with general ratings on helpfulness by associates.

CHAPTER VI

SEX DIFFERENCES

The Efficiency Tests

The means of speed in work for self and work for the group were obtained separately for boys and girls. Table 27 presents the data for the two sexes.

TABLE 27

Scores of Boys and Girls in Work for Self and for Group

School	Boys						Girls					
	N	S	G	D	S.D.	G/S	N	S	G	D	S.D.	G/S
L	165	48.0	44.0	—4.0	7.7	90	151	52.7	48.3	—4.4	8.4	.90
E	115	41.6	37.8	—3.8	4.8	94	108	43.7	40.2	—3.5	4.0	.92
W	139	40.4	39.9	—0.5	2.5	99	138	51.4	49.8	—1.6	3.8	.97
Total ..	419	43.1	40.9	—2.2	5.9	95	397	49.7	46.7	—3.0	6.2	.93

Columns S and G give the speed *per minute* in self and group work, respectively. Columns D and S.D. give the difference in speed and the standard deviation of the differences, and column G/S gives the ratio of the two speeds.

Table 27 indicates the following sex differences:

1. In each of the schools the girls worked at a higher speed than the boys. This holds true for self work as well as for group work.

2. The difference between speed of self work and speed of group work of the girls is *larger* than that of the boys. This holds true for two of the three schools and for the total population. In school W there is a marked difference in favor of the boys. The actual sex difference in W was 1.1, and the S.D. of the difference was .32, yielding a ratio of 3.4 which is statistically significant. For the total population the difference is 0.8, its S.D. is .42, and the ratio of the two is 1.9.

3. The ratio G/S of the girls is somewhat smaller than that of the boys. This indicates that the larger difference G-S of the girls was not due to their higher speed scores.

This sex difference becomes more pronounced if we compare the means of the 22 groups of boys and girls. The difference between the group means of G-S of boys and girls is 1.57 and its S.D. is .43 (utilizing the r of .79 between the two sets of means). The ratio of D/σD is then 3.66.[1]

Sex Differences in Sigma Scores

As far as the relative coöperativeness of the two sexes is concerned, the greater difference G-S and the smaller ratio G/S of the girls seem to indicate a greater discrepancy on their side between self and group work. It was necessary, however, to eliminate the sex difference in the original speed of G and S work. As noted before, the speed of the girls was generally higher. This might have resulted in a higher G–S.

The complications of the differences in the original G and S scores were eliminated by translating the G-S scores of each sex in terms of its own sigma. The means G-S of boys and girls were — 2.2 and — 3.0, respectively. The sigmas of their respective means were .29 and .32. In terms of sigma, then, the mean D's of boys and girls were 7.6 S.D. and 9.4 S.D., respectively. The girls' difference in speed between work for self and for group is even augmented when the differences are expressed in terms of their sigmas. Their difference in speed is not only larger than that of the boys but it is also of greater statistical significance. On this test, then, the girls were somewhat less coöperative than the boys.

Sex Differences in the Work Curves

It was shown in Chapter III that the means of S and G diverge constantly as the work progresses. Table 28 presents the means of S and G on each of the six test units (2 minutes each) for the two sexes.

Table 28 indicates the following:

1. The speed of the girls is higher than the speed of the boys on each of the six tests of self work and group work.

2. The difference between self work and group work tends

[1] S.D. diff. Boys–Girls $= \sqrt{\sigma_B^2 + \sigma_G^2 - 2r_{B,G}\sigma_B\sigma_G}$

to increase constantly. This increasing difference holds true for both boys and girls.

3. The difference between self work and group work increases and accelerates in the case of the girls to a larger degree than in the case of the boys.

4. There is thus a constantly increasing sex difference. If the G-S is taken as a score of coöperativeness, the girls grow less coöperative than the boys with the progress of the tests.

TABLE 28

SEX DIFFERENCES IN SIX SUCCESSIVE ALTERNATING UNITS OF WORK FOR SELF AND FOR GROUP

TEST	BOYS				GIRLS			
	S	G	G–S	G/S	S	G	G–S	G/S
1	85.2	82.6	—2.6	.97	98.2	95.0	— 3.2	.97
2	84.4	82.0	—2.4	.97	97.4	96.2	— 1.2	.99
3	86.6	84.2	—2.4	.97	100.0	95.8	— 4.2	.96
4	86.8	83.2	—3.6	.96	99.6	95.0	— 4.6	.95
5	87.6	78.8	—8.8	.90	99.4	90.2	— 9.2	.91
6	86.2	78.0	—8.2	.90	101.0	88.0	—13.0	.87

The sex difference increases also in significance. During the last unit the sex difference is five times its standard deviation. For the six units combined, the sex difference is 1.9 its S.D. Dividing the six tests into three groups of two units each, we have the following sex differences in terms of their corresponding S.D.'s: 1.2, 2.6, and 4.3.

It is evident, then, that the sex difference increases and that the difference increases in significance.

Sex Differences in the Increments in Speed

The relationships between speed of practice and work for self and group for boys and girls are shown in Tables 29 and 30.

Column P in Table 29 gives the speed of practice work. Columns S and G are the speed of self and group work, respectively. Columns s and g give the increment in speed above practice produced by the motives, S and G. The last two columns give the difference between the two increments and their ratios respectively.

TABLE 29

SEX DIFFERENCES IN THE INCREMENTS PRODUCED BY SELF AND GROUP MOTIVATION ABOVE THE SPEED LEVEL OF UNMOTIVATED WORK

SEX	N	P	S	G	s	g	g–s	g/s
Boys	417	38.3	43.1	40.9	4.8	2.6	—2.2	.54
Girls	397	43.9	49.7	46.7	5.8	2.8	—3.0	.48

Table 29 shows the following relationships:

1. The girls' speed of unmotivated work is higher than that of the boys.

2. Each form of motivation has produced an increment above unmotivated speed for both boys and girls. This holds true for each school.

3. The increment produced by the self motive is higher than the one produced by the group motive for boys and girls in each school.

4. The difference g-s is larger in case of the girls. This also indicates a lesser degree of coöperativeness on the side of the girls. If we accept the increment produced by the motive of self as the unit of motivation, M (see p. 27), we may then express the intensity of the group motive in terms of it. In case of the boys the unit M was 4.8 and so the ratio of the group motive was 2.6/4.8 or .54. For the girls M was 5.8 and the ratio of the group motive was 2.8/5.8 or .48. The sex difference in coöperativeness amounted to 6 per cent of M in favor of the boys.

Initial Increment

It was shown above that the sex difference in G–S was very slight in the initial part of the tests and increased with the progress of the tests. Table 30 shows the sex difference in the increment in speed produced by the initial units of self and group work above the unmotivated level.

The columns in this table correspond to those in Table 29. Columns S_i and G_i give the speed of the initial units of self work and group work, respectively. Each score is an average of two minutes of work. Similarly s_i, g_i, g_i-s_i and g_i/s_i refer to the increments produced by the initial units of work for self and group.

TABLE 30

SEX DIFFERENCES IN THE INITIAL INCREMENTS PRODUCED BY SELF AND GROUP MOTIVATION ABOVE THE LEVEL OF UNMOTIVATED WORK

SEX	N	P	S_1	G_1	s_1	g_1	g_1-s_1	g_1/s_1
Boys	417	38.3	42.6	41.3	4.3	3.0	—1.3	.70
Girls	397	43.9	49.1	47.5	5.2	3.6	—1.6	.69

Table 30 indicates the following:

1. There is an initial increment in work for self and in work for group for both sexes.

2. The increment produced by the self motive was higher than the increment produced by the group motive. This held true for boys and girls.

3. The increment s_1 was larger in the case of the girls in each school.

4. The increment g_1 was also slightly larger in the case of the girls.

5. The difference g_1-s_1 was larger for the girls than for the boys, while their ratio g_1/s_1 was slightly smaller.

Sex Differences in the Retentivity of Self and Group Motivation

It will be recalled that each test consisted of two minutes of work. A comparison of the means of the first (A) and second (B) minutes of work will indicate the retentivity of the two forms of motivation for boys and girls (see Chapter III).

TABLE 31

COMPARISON OF FIRST AND SECOND MINUTE OF SELF WORK AND GROUP WORK FOR BOYS AND GIRLS

TEST	SELF						GROUP					
	Boys			Girls			Boys			Girls		
	A	B	Diff.	A	B	Diff.	A	B	Diff.	A	B	Diff.
1	44.3	40.9	3.4	49.9	47.3	2.6	42.7	39.9	2.8	48.8	45.8	3.0
2	42.9	41.6	1.3	51.2	47.1	4.1	42.3	39.7	2.6	50.4	45.6	4.8
3	44.7	41.9	4.8	51.5	48.8	2.7	43.1	41.2	1.9	49.1	46.7	2.4
4	44.3	42.2	2.1	50.6	49.0	1.6	42.5	40.8	1.7	48.3	46.7	1.6
5	44.2	42.7	1.5	51.0	48.8	2.2	40.3	38.6	1.7	45.8	44.3	1.5
6	44.3	41.8	2.5	51.5	49.4	2.1	40.1	37.9	2.2	45.7	42.4	3.3
M.....	44.1	41.8	2.3	51.0	48.4	2.6	41.8	39.6	2.2	48.0	45.2	2.8

Columns A and B give the speed of the first and second minute of work of each unit, and Diff. gives the difference between the two. The first six columns present the sex differences in retentivity of the self motive. The last six columns show the same for the group motive.

Table 31 indicates the following:

1. The speed of the second minute of each test unit is lower than the speed of the first minute of work. This holds true for self work and for group work, for boys and for girls.

2. The drop in speed from first to second minute tends to decrease in the units of self work of boys and girls. The negative acceleration is —.18 and —.10 respectively.

3. In the units of group work a sex difference is apparent. For the boys the drop decreases to the extent of —.12 examples per minute. For the girls the drop increases slightly (+.06 examples per minute).

4. In the case of the boys the average decrease from first to second minute in work for group is slightly less than in work for self. In the case of the girls the reverse holds true. The decrease in group work is larger than the decrease in self work.

Percentage Coöperating

A small sex difference is observed if we compare the percentage of coöperative children (those working for group at a speed equal to or larger than the speed of work for self) of the two sexes, as shown in Table 32.

TABLE 32

PERCENTAGES OF COÖPERATIVE BOYS AND GIRLS IN EACH OF THE SCHOOLS

SCHOOL	BOYS		GIRLS	
	N	Per Cent Coöperative	N	Per Cent Coöperative
L	165	26	151	34
E	115	30	108	27
W	139	51	138	42
Total	419	35	397	34

In two out of three schools and in the total population the percentage of coöperative girls was slightly smaller than the percentage of similarly coöperative boys.

Sex Differences in the Free Choice Tests

The data concerning the sex differences in the Free Choice tests are presented in Table 33. It shows the percentage of children coöperating, the average number of work units contributed to the group, the standard deviations of the same, and the coefficient of variation for boys and girls.

TABLE 33

Sex Differences in Choice

School	Boys					Girls				
	N	% Coöp.	Mean	S.D.	V	N	% Coöp.	Mean	S.D.	V
L	162	70	2.8	2.2	77	149	83	2.8	1.7	61
E	114	58	1.8	1.5	83	107	78	2.5	1.7	68
W	141	73	2.9	2.2	76	138	73	2.6	2.0	75
Total	417	67	2.6	2.1	81	394	78	2.7	1.8	69

It is seen from Table 33 that the three schools differed from one another in regard to the relative coöperativeness of the two sexes. In school E the girls were significantly more coöperative. The sex difference in terms of its S.D. was $.7/.22 = 3.1$.

In school W the girls were somewhat less coöperative. The difference was 1.2 in terms of its S.D.

In school L the two means are identical (but the median of the girls was slightly higher). In the total population the girls have a slightly higher mean. The difference is 1.0 in terms of its S.D.

If we compare the means of boys and girls in the twenty-two groups, the sex difference in favor of the girls becomes more significant. The difference between the grand means is 2.5 times the S.D. of the difference.

Sex Differences in Variability

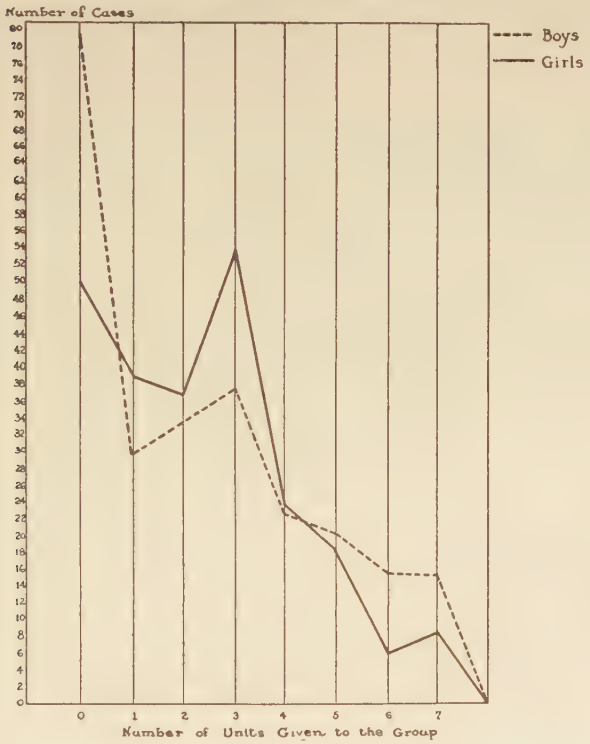
The difference between boys and girls in variability was larger than the difference between their means. As is seen from Table 33 the S.D. of the boys tends to be considerably greater than the S.D. of the girls. For the total population this difference is 4.1 its own sigma, which indicates a true difference.

The coefficient of variation, V, of the girls is smaller than the

V of the boys in each one of the schools. The source of the greater variability of the boys becomes evident from an inspection of Table 33 or from the frequency distributions of boys' and girls' scores in this test. This is presented in Figure V. The base line is the scale of scores ranging from 0 to 7, the number of work units contributed to the group. The altitudes give the number of cases making a given score.

FIGURE V

SEX DIFFERENCES IN THE FREE CHOICE TEST



It will be noted that the frequencies of the boys at both extremes, those who gave nothing and those who gave away everything, are higher than those of the girls. This tendency of the boys to behave either in an extremely selfish or in an extremely coöperative manner resulted in greater variability among the boys than among the girls.

This sex difference becomes more apparent if we divide the

population into three groups,—those giving everything to their class (6 or 7, group A), those giving a part to their class (1 to 5, group B), and those giving nothing (0) to their class (group C). We can now find the percentage of either sex falling within each of these three groups. This is presented in Table 34.

TABLE 34

SEX DIFFERENCES IN VARIABILITY ON THE FREE CHOICE TEST

SEX	GIVING ALL	SHARING	GIVING NOTHING	N
Boys	12.3	56.9	30.8	404
Girls	6.3	72.8	20.9	391

The percentage of boys taking all of the work units for themselves is larger than the percentage of girls acting in the same way. This held true in each of the three schools. Thirty-one per cent of the 404 boys in the total population gave nothing to their group. Of the 391 girls, only 21 per cent belonged in that group. The difference of 10 per cent is 3.2 its standard deviation. It will be seen also that the percentage of boys found in the most coöperative group, those giving everything to their group, is twice as large as the percentage of girls in that group. The difference is three times its S.D.

There was a significantly larger percentage of boys among those who took all the work-units for themselves as well as among those who gave all their work units to the class. There was a larger percentage of girls among those who shared their work units with the class.

Speed and Free Choice

Table 35 presents the speed scores made on the Free Choice tests of those who gave all or all but one unit to their class (group A), those who shared (group B), and those who took all or all but one unit for themselves (group C).

Table 35 indicates the following:

1. Those of group B have the highest speed score, and those of group A have the lowest speed score. This holds true for boys and girls of each school.

2. The girls have higher speed scores than the boys in each of the groups.

TABLE 35

SEX DIFFERENCES IN SPEED OF THREE GROUPS OF "CHOOSERS"

SEX	A		B		C	
	Boys	Girls	Boys	Girls	Boys	Girls
N	39	27	167	204	177	159
Med. Speed	35.5	36.9	45.8	49.8	38.8	47.4

3. The sex difference in speed is least in the A group. In the total population it is only 1.4. The difference is larger in group B (4.0) and largest in group C, where it amounts to 8.6 examples per minute.

The sex difference in speed appears to be greatest among the least coöperative (competitive) children and smallest among the most coöperative ones. This seems to indicate that motivation increases rather than decreases such individual differences as are found between the sexes.

Sex Differences in Speed on the Free Choice Tests

It was shown in Chapter III that the difference in speed between self and group work on the Free Choice test increased with the progress of the tests. There seems to be a sex difference in this respect. The results are presented in Table 36. This table

TABLE 36

SEX DIFFERENCES IN SPEED ON SIX SUCCESSIVE UNITS OF THE FREE CHOICE TEST

SEX		GROUP	1	2	3	4	5	6
Boys	417	Self	48.5	45.5	44.0	42.9	43.4	43.6
		Group	41.8	40.2	37.3	39.3	36.4	37.6
		Diff.	−6.7	−5.3	−6.7	−3.6	−7.0	−6.0
Girls	397	Self	54.1	51.3	49.8	47.7	47.8	49.5
		Group	42.0	44.5	43.6	41.2	43.2	42.6
		Diff.	−12.1	−6.8	−6.2	−6.5	−4.6	−5.9

reads as follows: The boys who chose to work for self on the first unit of choice worked at a mean speed of 48.5 examples per minute. Those who chose to work for the group worked at a speed of 41.8 examples per minute. The difference in speed was 6.7 examples per minute, etc.

Table 36 indicates the following sex differences:

1. The speed of the boys in self work shows a tendency to decrease. Their speed in group work tends to decrease slightly. The difference G-S first decreases and again increases.

2. The speed of the girls in self work is extremely high in the first unit; then it decreases. The means of group work tend to increase slightly. There is a slight decrease in G-S with the progress of the test units.

Sex Difference in Efficiency on the Free Choice Tests

The average difference in speed between self and group work was — 5.9 for the boys and — 6.9 for the girls. The girls were thus slightly less coöperative, showing a greater discrepancy in speed between the units chosen to work for self and those chosen for group.

Summary

In speed of work the girls' score was higher than the boys'. This applies to both motivated and unmotivated work.

The superiority of the girls was more marked in speed of work for *self* than in work for the group. The difference between S and G was larger for the girls. They were thus less cooperative than the boys on the Efficiency test.

The sex difference in coöperativeness increased with the progress of the test. In the last test unit the sex difference was largest. While the sex difference in persistence for self work was in favor of the girls the difference in persistence for group work was in favor of the boys. The girls were more persistent in work for self and less persistent in work for the group.

The increment produced by the motive of self above the unmotivated level was larger for the girls than for the boys. This sex difference was *five* times as large as the one in the increments produced by the group motive.

The retentivity of the group motive was somewhat *higher* than that of the self motive for the boys and somewhat lower for the girls.

The girls were somewhat more coöperative than the boys on the Free Choice test. Their average number of choices for group was slightly larger, and the percentage coöperating (above zero) was larger for the girls.

There were more boys than girls who gave nothing to their group. There were also more boys than girls who gave all their work units to the group. There were more girls than boys who shared their work units with the group. The boys showed greater variability than the girls on this test.

The girls were less coöperative than the boys on the Efficiency test, which involves persistent work for the group, and more cooperative than the boys on the Free Choice test, which involves the giving away of work units to the group.

CHAPTER VII

FACTORS OF EXPERIENCE

Chronological Age

Do children tend to become less or more coöperative in group projects as they grow older?

The Efficiency Coöperation Test

Table 37 shows the correlation between chronological age and score on this test for the three schools, L, E, and W, and for the total population.

TABLE 37

The Correlation Between Age and Efficiency Coöperation

School	N	r	P.E.
L	244	—.162	.04
E	202	—.042	.05
W	267	.116	.04
Total	713	—.101	.02

From Table 37 it can be seen that the r between age and Efficiency coöperation is consistently low and differs radically from population to population. For school L, composed chiefly of the children of unskilled laborers, the r is negative. The older children tend to be less coöperative than the younger ones. The discrepancy between speed of work for self and group increases with age in that school. The older children probably have less affection for the classroom than the younger ones upon whom the classroom exerts a stronger hold.

In school W, the population of a small community, the reverse relationship holds true. The correlation with age is slightly positive. The children tend to become more coöperative as they grow older. The conditions of the community are such that interaction is inevitable. The common conditions of living tend

to bring the children nearer to one another and this nearness increases with age.

In population E, the r is practically zero. The children of this well-to-do neighborhood tend neither to increase nor to decrease in coöperativeness as they grow older.

In the total population the r age with Efficiency coöperation is slightly negative. This is due, in part, to the heterogeneity resulting from combining the three populations. School L, which had the lowest mean in coöperation, had the highest mean in age. This created a negative correlation. The average r is practically zero (— .029).

The Free Choice Test

The relation between age and coöperation on the Free Choice test is similar to that of age and Efficiency coöperation. Table 38 shows the r for each school and the total.

TABLE 38

Correlation Between Age and Free Choice

School	N	r	P.E.
L	224	—.114	.04
E	202	.048	.05
W	267	.044	.04
Total	713	.028	.03

Again we see that in school L, the number of work units given away to the group decreased with age. In schools E and W and in the total population the correlation is practically zero.

The Free Choice test lends itself easily to be divided into three scores: those who gave nothing to their class; those who shared their work units with their class; and those who gave all their work to the class. Table 39 shows the mean age of each group.

TABLE 39

Mean Age of Those Who Gave Nothing, Those Who Gave a Part of Work, and Those Who Gave All to Their Class

School	L	E	W	Total
Giving Nothing	13.3	11.4	11.8	12.1
Sharing	12.7	11.8	12.4	12.5
Giving All	12.4	12.5	12.4	12.5

In school L those who gave everything to the class were the youngest; those who gave nothing, the oldest. In school E, the reverse held true. In school W and in the total population the least coöperative group was youngest and the other two groups were of the same age.

Three Age Groups

The population of each one of the three schools was divided into three age groups of three years' range each. Table 40 presents the means on the Free Choice made by each age group. The mean is the average number of units of work given to the group (the total number of work units was seven). The percentage of each group whose score was above zero is also shown.

TABLE 40

The Mean Scores on the Free Choice of the Three Age Groups

Age in Years	School L		School E		School W		Total	
	Median	Per Cent Coöperative	Median	Per Cent Coöperative	Median	Per Cent Coöperative	Median	Per Cent Coöperative
8-10 ..	3.27	82	1.55	62	1.55	63	2.00	70
11-13 ..	2.64	81	2.95	74	2.95	80	2.45	74
14-16 ..	2.33	64	2.05	67	2.05	77	1.94	74

It is shown that in school L the order of age and score is reversed. The younger children are the most coöperative and the oldest, the least coöperative. In schools E and W, and the Total, the middle group, age 11-13, has the highest mean. The middle age group is one that has the least number of accelerated and retarded children, and thus, the most normal. This normality may be associated with high coöperation. This will be discussed more fully under Age-Grade Status.

The same relationship between age and coöperation is found if we compare the percentages of each age group coöperating on the Free Choice test (those whose score is above zero). In schools E and W the older children had a higher percentage of children coöperating than did the younger children. In school L the reverse held true. This is in accord with the correlation between age and coöperativeness in the three populations.

In summary, as far as the total population is concerned there

is a slightly positive correlation between age and score on the Free Choice tests and a similarly low but negative correlation between age and efficiency coöperation. There is, however, a great difference between schools in this connection.

In population W, where the environment was conducive to cooperativeness, as evidenced from the high coöperation average, the coöperation score increases with age. In population L, the lowest in coöperation, the environment is probably such that competition rather than coöperation is encouraged. Hence the decrease of coöperation with age.

Persistence and Age

The correlation between chronological age and persistence in self work was slightly positive .089 ± .02. The same correlation with persistence in work for the group was slightly negative — .069 ± .02.

Age-Grade Status

The preceding data dealt with the relation between coöperation and age. No account was taken of differences in grade. Do children of the upper grades tend to be less or more coöperative than those of the lower grades?

TABLE 41

Efficiency Coöperation and Grade Status

Grade	School L			School E			School W			Total		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
V	46	98.8	3.8	37	98.3	3.7	97	100.0	2.5	180	99.3	3.2
VI	47	96.8	5.0	65	96.7	3.8	68	98.7	3.0	180	97.5	4.0
VII	133	95.0	9.5	77	98.0	4.1	73	98.7	4.0	283	96.8	7.3
VIII ...	87	93.7	8.0	39	96.8	6.2	40	98.8	3.8	166	95.7	7.1
V and VI	93	97.8	4.5	102	97.3	3.8	165	99.5	2.8	360	98.4	3.7
VII and VIII ..	220	94.5	9.0	116	97.6	4.9	113	98.8	3.9	449	96.4	7.3

Table 41 shows that the relationship between grade status and Efficiency coöperation differs from school to school. In school L, and in the total, the order of the grades and their means on coöperativeness are in exactly the reverse order. The higher the grade the lower the coöperation. In the other two schools the

order is indefinite, except that Grade V has in each case the highest average.

The Progress of Work

It is worthy of note that the difference between grades tended to become larger as the Efficiency tests progressed.

TABLE 42

Progress of Work by Grades

Grade	No.	Test	1	2	3	4	5	6
		Self	37.9	36.8	37.1	36.8	36.9	37.3
V	176	Group	36.4	36.4	36.8	37.7	36.1	35.2
		Diff.	—1.5	—0.4	—0.3	0.9	—0.8	—2.1
		Self	43.4	44.3	43.5	44.6	42.7	41.9
VI	91	Group	43.4	44.2	43.1	41.8	38.5	37.6
		Diff.	0.0	—0.1	—0.4	—2.8	—4.6	—5.9
		Self	46.6	46.6	48.2	47.3	48.3	48.8
VII	143	Group	44.8	44.8	45.2	44.6	43.7	42.9
		Diff.	—1.8	—1.8	—3.0	—2.7	—4.6	—5.9
		Self	54.4	48.8	50.6	50.6	51.2	51.7
VIII	85	Group	51.3	47.6	48.5	47.5	41.5	43.9
		Diff.	—3.1	—1.2	—2.1	—3.1	—6.7	—7.8

Table 42 indicates the following:

1. The speed of self work is greater than the speed of group work on practically each of the six tests in each grade. Only in one out of the 24 comparisons is the speed of group work slightly higher.

2. In each grade the tendency of the difference (group minus self speed) increases throughout the progress of the tests. The difference at the end of the testing was larger than the difference at the beginning of testing in each one of the grades.

3. The difference G-S increases with grades, the upper grades showing larger differences than the lower grades. This increase with grade is particularly marked and consistent in the last two test units.

Persistence and Grade Status

It was shown in Chapter III that the difference between speed of self work and speed of group work resulted from the lack of

persistence under the latter motive. It is therefore essential to compare the grades on their persistence scores in work under the two forms of motivation. Tables 43A and 43B show the scores of persistence in work for self and in work for group for the lower Grades V and VI and the upper Grades VII and VIII.

TABLE 43A

PERSISTENCE IN WORK FOR SELF, BY GRADE

GRADE	SCHOOL L			SCHOOL E			SCHOOL W		
	No.	Mean	S.D.	No.	Mean	S.D.	No.	Mean	S.D.
V and VI ..	93	−9.9	30.6	101	−6.8	28.7	160	4.5	21.8
VII and VIII	217	2.8	39.7	118	9.7	20.0	115	6.4	20.0

TABLE 43B

PERSISTENCE IN WORK FOR THE GROUP, BY GRADE

GRADE	SCHOOL L			SCHOOL E			SCHOOL W		
	No.	Mean	S.D.	No.	Mean	S.D.	No.	Mean	S.D.
V and VI ..	92	−11.6	37.6	102	−22.5	26.5	161	−12.2	29.3
VII and VIII	216	−14.6	40.7	118	− 6.5	29.6	115	− 0.4	21.9

In each one of the schools the upper grades display greater persistence than the lower grades in work for self. In fact, the persistence score of the upper grades is positive throughout. Their speed increased with the progress of work. In the lower grades (of schools L and E) the score is negative, indicating a drop in speed. This difference between the grades is not surprising in view of the positive correlation between age and persistence in self work.

The relationship between grade status and persistence in group work is quite different. The upper grades of school L which displayed greater persistence than the lower grades in work for self, showed *less* persistence in work for the group. This is in accord with the results concerning coöperativeness in this school. It was shown before that here the means of cooperativeness and order of grades were in reverse order.

Free Choice Test

The relation between grade status and coöperation on the Free Choice test is similar to, though not identical with, the

relation between grade status and coöperation on the Efficiency test.

TABLE 44

MEANS OF FREE CHOICE BY GRADES

GRADE	SCHOOL L		SCHOOL E		SCHOOL W		TOTAL	
	N	Mean	N	Mean	N	Mean	N	Mean
V	46	3.48	37	1.85	97	2.31	180	2.51
VI	47	2.26	66	2.06	68	2.51	181	2.28
VII	133	2.83	76	1.72	74	3.65	283	2.75
VIII	87	2.78	42	3.14	40	2.85	169	2.88
V and VI	93	2.86	103	1.99	165	2.40	361	2.40
VII and VIII	220	2.81	118	2.23	114	3.37	452	2.80

Again we note that in school L the lowest grade has the highest score. The upper grades have a slightly smaller score than the lower grades. In the other two schools and in the total the upper grades score higher than the lower grades. Thus the relation between grade and coöperation depends upon the nature of the school.

ACCELERATION AND RETARDATION

The factor of acceleration and retardation undoubtedly affects a child's attitude toward his or her class. As these tests attempted to measure the extent of a child's loyalty to the classroom the relation between age-grade status and coöperation was considered an important factor.

Since the score on the Efficiency coöperation test is derived from the speed of work under two forms of motivation it is interesting to note the relationship between *speed* of work and age-grade status. Table 45 presents the average speed (examples

TABLE 45

AGE-GRADE STATUS AND SPEED OF WORK

GRADE	ACCELERATED		NORMAL		RETARDED	
	N	Med.	N	Med.	N	Med.
V	39	34.4	78	37.9	70	40.0
VI	42	39.5	37	48.4	69	52.5
VII	52	52.1	78	54.4	112	54.8
VIII	58	60.0	70	65.3	50	72.5

per minute) of the accelerated, normal, and retarded of each grade.

In each grade the speed of the accelerated is lowest and that of the retarded is highest. The speed of the retarded of Grades V and VI equals the speed of the accelerated of Grades VI and VII, respectively.

Table 46 presents the median scores on the Efficiency and Free Choice tests of the accelerated normal and retarded children.

TABLE 46

Coöperation and Age-Grade Status

	Accelerated	Normal	Retarded
Efficiency Coöperation	98.3	98.5	97.5
Free Choice	2.3	2.7	1.9
N	192	284	294

Table 46 shows that the normal group scored highest and the retarded group lowest on each of the tests.

Progress of Work

A similar relationship was found between age-grade status and persistence of work. The score of persistence, it will be recalled, was the speed of the last four minutes of work minus the speed of the first four minutes. Tables 47A and 47B give the mean persistence score for the accelerated, retarded, and normal of each grade, in each of the three schools and total.

In persistence of self work the normal group is by far superior to either the accelerated or the retarded ones. In each of the four grades the normal group scored the highest in persistence. Its score was consistently positive. At the end of twenty-four minutes of work, this group of children in each respective grade went on working at even a higher efficiency than at the beginning of the test. The two other groups had a negative persistence score. The accelerated group had a particularly low persistence score. This group consists of extremely young children, and persistence is correlated positively with chronological age.

The same relationship between age-grade status and persistence holds true for group work. There, too, the retarded and accelerated children were generally less persistent than the normal ones.

TABLE 47A

PERSISTENCE IN SELF WORK AND AGE-GRADE STATUS

GRADE	ACCELERATED		NORMAL		RETARDED	
	N	Med.	N	Med.	N	Med.
V	39	−11.0	78	5.4	70	−7.5
VI	42	−14.5	77	2.6	69	0.1
VII	52	8.7	78	12.5	112	8.8
VIII	58	−2.8	70	1.2	50	−4.2
Total	191	−4.9	303	5.4	301	−0.7

TABLE 47B

PERSISTENCE IN WORK FOR GROUP AND AGE-GRADE STATUS

GRADE	ACCELERATED		NORMAL		RETARDED	
	N	Med.	N	Med.	N	Med.
V	39	1.1	78	6.0	70	− 5.0
VI	42	−39.0	77	−13.0	69	−18.0
VII	52	−10.0	78	4.4	112	−18.3
VIII	58	− 8.1	70	− 9.8	50	−12.6
Total	191	−14.0	303	−3.1	301	−13.5

INTELLIGENCE AND COÖPERATION

The measure of intelligence was the I. E. R. tests, composed of the following four tests: Information, vocabulary, arithmetic, and sentence completion. It yields a mental age point score.

The correlation between mental age and coöperation (Free Choice) was $+ .139 \pm .02$. This correlation holds true for each of the three schools. It is highest for school W and lowest for school L. The correlation between mental age and Efficiency coöperation is practically zero in each of the schools. In the upper grades, however, the correlation is marked, $+ .199 \pm .03$ in Grade VII and $+ .136 \pm .03$ in Grade VIII.

Mental Age and Persistence

The correlation between mental age and persistence (in work for the group) was $.1275 \pm .02$. The correlation is positive but low. The relationship between the two variables becomes more overt if we consider persistence dichotomously: A, those who had a positive score, increased in speed as the test went on, and

B, those who had a negative score, decreased in speed with the progress of the test. In Table 48 are the means in mental age of the persistent (A) and the non-persistent (B) groups.

TABLE 48

MENTAL AGE OF PERSISTENT AND NON-PERSISTENT CHILDREN

SCHOOL	A			B			DIFF.	D/σD
	N	Mean	S. D.	N	Mean	S. D.		
L	117	96.9	25.9	158	89.1	21.3	7.8	2.7
E	75	102.9	26.8	124	97.7	23.1	5.2	1.4
W	126	94.5	22.2	135	93.9	22.5	0.6	.2
Total	318	97.4	24.9	417	93.2	22.5	4.2	2.4

In each one of the schools the persistent group is of higher mental age.

Similarly, the persistence means were found for those above + 1 S. D. (A) and for those below — 1 S. D. (B) in mental age. They are shown in Table 49.

TABLE 49

PERSISTENCE AND MENTAL AGE

SCHOOL	A			B			DIFF.	D/σD
	N	Mean	S. D.	N	Mean	S. D.		
L	79	0.1	38.2	74	—18.5	42.1	18.4	2.8
E	53	—2.4	26.5	40	—16.1	30.3	13.7	2.3
W	89	—0.1	18.6	65	— 2.7	26.0	2.6	.7
Total	221	—0.6	19.0	179	—12.2	24.0	11.6	5.3

Again we see that in each of the schools those of higher M. A. have higher persistence scores than those of lower mental age.

BRIGHTNESS AND COÖPERATION

The intelligence score obtained from the I. E. R. test is similar to, though not identical with, an I.Q. It is the deviation of a child's score from the mean of his age group in terms of the S. D. of the distribution. A score of 50 is normal, and points above and below indicate degrees of brightness and dullness, respectively.

The correlation between intelligence and Efficiency coöperation was $+ .14 \pm .02$, between intelligence and Free Choice the r was $+ .10 \pm .02$, and the r with persistence in group work was $+ .12 \pm .02$.

The correlation between intelligence and either one of the cooperation tests was thus positive but rather low.

Comparison of Means

The relationship between intelligence and coöperativeness is brought out more adequately by a comparison of the intelligence scores of those reaching various degrees of coöperation scores.

The Free Choice Test

The scores on the Free Choice test ranged from zero (when a child took all units for himself) to 7 (when a child gave all units to the class). Table 50 presents the average intelligence of each of the eight groups of children.

TABLE 50

INTELLIGENCE AND FREE CHOICE

NUMBER GIVEN	0	1	2	3	4	5	6	7
Median Intelligence	47.2	46.3	47.6	47.7	47.7	47.7	49.2	50.2
N	210	131	130	131	74	27	27	34

Table 50 indicates that the order of the groups in coöperation is very similar to their order in intelligence. Those who gave all or nearly all units to their group had the highest median intelligence and those who gave nearly nothing to the group had the lowest median intelligence.

There was only one exception—those who took all the units for themselves were of *higher* intelligence than those who took all but one, giving one unit to the group.

The Efficiency Test

The scores on the Efficiency test were similarly divided into four groups: above 100 definitely coöperative, 96-100 mildly coöperative, 90-95 somewhat uncoöperative, below 90 definitely uncoöperative. The respective medians of intelligence of these four groups were 46.5, 45.6, 45.6, and 41.6 in school L and 49.0, 49.8, 51.1, and 50.7 in school E.

The relationship was not as consistent as in the case of the Free Choice test, and it differed from population to population. In school L the order of the groups in coöperation was the same as that of intelligence. In school E the order was about reversed.

It seems that high Efficiency coöperation goes with a certain degree of intelligence (about average), while low coöperation goes with either high or low intelligence. In school L where the general level of intelligence was below the average (of our total population) the most coöperative children were the most intelligent ones (those approaching the average). In school E where the general level of intelligence was above the average the most coöperative children were the least intelligent ones (those approaching the general average).

The difference in intelligence between the *coöperative* children of schools L and E was 3.5 points, while the difference between the medians of the uncoöperative children of L and E was 9.1, nearly 3 times as large as the former difference. The uncooperative group included the most intelligent of the "bright" population and the least intelligent of the "dull" population.

The total population was also divided into three sections on the basis of intelligence. Those of the upper quartile, the bright; those of the interquartile range, the average; and those of the lower quartile, the dull. The medians of coöperation of the three groups were 98.8, 99.3, and 97.6 respectively. The group of average intelligence was thus highest in coöperativeness. Cooperation seems to increase with intelligence until a certain level. Beyond that level of intelligence, coöperativeness is on a decrease. The bright group coöperated less than the average group and the dull group coöperated least.

A similarly curvilinear relationship between intelligence and coöperation is obtained if we compare the relative status of our three populations in these variables. This is shown in Table 51. School W, second in intelligence, is highest in coöperation, school E, highest in intelligence, is second in coöperation, and school L, lowest in intelligence, is lowest in coöperation.[1]

Variation of Intelligence and Coöperativeness

The above comparisons took cognizance only of the central tendency of intelligence (mean or median) irrespective of the

[1] The correlation ratio, eta, between intelligence and Efficiency coöperation was +.28.

TABLE 51

INTELLIGENCE, ITS VARIATION AND COÖPERATION

SCHOOL	N	INTELLIGENCE			EFFICIENCY COÖPERATION
		Mean	S. D.	V	
L	302	45.4	8.25	18.2	95.5
E	222	50.8	9.75	19.2	97.4
W	286	47.4	7.92	16.7	99.0

variation in the latter. It will be noted from Table 51 that school W, the highest in coöperation, has the *lowest* standard deviation and coefficient of variation of intelligence; i.e., the highest degree of homogeneity of intelligence. The difference between schools W and E in S. D. of intelligence is 1.83, which is 3.3 times the sigma of the difference.

Additional evidence of the inverse relationship between variation of intelligence and coöperativeness is the negative correlation between the group means in Efficiency coöperation and their respective S. D. in intelligence. This correlation was — .26.

Coöperation of a group seems to depend less on the average magnitude of intelligence of the group than on the variation within it. The greater the homogeneity of intelligence within the group the greater the coöperativeness of its members.

Before drawing any conclusions from our data concerning the relationship between intelligence and coöperativeness the following factors should be considered:

1. The test situations were such that the interest of self was somewhat in conflict with the interest of the group, to a greater extent than in ordinary coöperation. The Free Choice required the giving away to the group units of work which, when withheld, would help toward the winning of a personal prize. In the Efficiency tests, if a child worked at a lower speed on the class units he could more readily work at top speed on the self units. Now the more intelligent child is probably more ambitious; he thus took the self tests more seriously and, consequently, had a lower coöperation score.

2. A certain intelligence level is required to understand the test directions.

3. It is possible, however, that the two factors, intelligence and coöperation, are actually associated only to a small extent, if at all. Those of high intelligence are probably not fascinated by the idea of coöperating as a unit to achieve one goal but rather choose to do work (often of great social utility) independently.

4. In order to be coöperative, what is required of members of a group is probably not high intelligence as much as homogeneity of intelligence and common interest.

School Status

There were available two additional measures of school status, the average of teachers' marks in such subjects as arithmetic, English, etc., and the mark on deportment in school. The correlation of average school mark with Efficiency was .05 and with Free Choice, .09.

The correlations between deportment score and the two cooperation scores were + .10 and + .17, respectively.

The grade attained in the various school subjects is practically unrelated to coöperation as measured on our tests. There is a somewhat higher degree of association between coöperation and deportment in school. The uncoöperative child is probably more often a discipline problem and thus tends to score low in deportment.

Social Intelligence and Moral Knowledge

Good Citizenship

This is one of the tests devised by the Character Education Inquiry. It tests the child's knowledge of what is the "most sensible, helpful and useful" thing to do in fifty different situations involving *social* adjustment. The correlation between scores on this test of social intelligence and Efficiency coöperation was .28 ± .04.

Moral Knowledge

Scores on two moral knowledge tests of the Character Education Inquiry were available. One of the tests attempted to measure the informational element of moral standards, and the other the aspect of opinion. Table 52 shows the correlation be-

TABLE 52

CORRELATION BETWEEN MORAL KNOWLEDGE AND COÖPERATION

MORAL KNOWLEDGE TESTS	N	FREE CHOICE		EFFICIENCY COÖPERATION		PERSISTENCE	
		r	±	*r*	±	*r*	±
Information	796	.12	.02	.09	.02	.15	.02
Opinion	789	.13	.02	.06	.02	.09	.02

tween these moral knowledge scores and Free Choice, Efficiency coöperation, and Persistence in group work.

The correlation between our total coöperation score and Opinion was $+ .10 \pm .02$, and with Information the r was $.11 \pm .02$.

The correlations are extremely low and some of them are within the limits of unreliability. The correlations are somewhat higher for the Free Choice test than for the Efficiency coöperation test.

School L, which was generally low on coöperation tests, showed highest correlation with moral knowledge, while school W, highest on each of the tests, showed the lowest correlation with moral knowledge.

The correlation with the Good Citizenship test, which involves definitely social situations, was much higher than with any of the moral knowledge tests. It seems to indicate that the r between coöperative behavior and knowledge increases as the knowledge test becomes more specific and more similar to the behavior tested.

SUGGESTIBILITY AND COÖPERATIVENESS

The Otis Suggestibility test was given, in modified form, to the total population ($N = 719$). The test attempts to measure the resistance to suggestion, a high score indicating a high degree of non-suggestibility.

The correlation between non-suggestibility and Efficiency cooperation score was $.145 \pm .02$. For the Free Choice test the r was $.169 \pm .02$. For the total coöperation score (W) the r was $.156 \pm .02$.

Non-suggestibility is correlated with each one of the coöpera-

tion tests. The correlation is low but consistently positive and higher than four times the probable error.

Conflicts with Group Standards

A group of 98 boys of population W were given an extensive attitude test. Fifty situations were described and a child was to state whether he likes it, or dislikes it (such as the smoking of cigarettes, etc.), whether he feels he ought to like it, whether the boys of his group like it, etc. The following scores were finally obtained: [2]

1. Feeling of difference: a high score means that the child considers himself different from other boys of his group.
2. Idea of the right: A high score means that the child's statement of how he ought to feel deviated much from the feeling of his group (how they said they feel).
3. Self criticism: A high score means that the child considers his actual feeling to differ much from his ideal.
4. Criticism of others: A high score indicates that the child considers the standard of the group to differ much from his ideal.

The following relationships with scores on our tests were found.

1. Self criticism: Those who scored high in self criticism were significantly less coöperative on the Free Choice tests than those who scored low; the difference was 3.2 in terms of its S. D.
2. Idea of the right: Those who scored low, those whose ideal deviated least from the standard of the group, were more coöperative on the Efficiency test than those whose ideal deviated much from the group standard. The correlation between the two sets of scores was $-.196 \pm .05$.
3. Criticism of others and feeling of difference: The relationship between each of these two scores and coöperation (Free Choice) was curvilinear. Those who scored highest in them, as well as those who scored lowest, were more coöperative than those whose score was near the mean. The differences, however, were within their respective unreliabilities.

[2] For descriptions of tests and the comparisons that follow see L. Sweet, A Personal Attitude Test for Younger Boys. Doctor's dissertation, Teachers College, Columbia University.

CHAPTER VIII

BODILY CONDITIONS AND COÖPERATION

Anthropometric Measurements

That bodily size and form is a factor in one's adjustment within a group is common observation. There is also some experimental evidence in its support. It has been shown that stature is correlated with popularity. Leaders have been found by Caldwell [28] to be above average in height. Rohrbach, who investigated 4,400 children and their leaders found the latter to be a bit taller [116]. Wellman [156] has shown that boys and their best friends tend to be somewhat alike in height.

Four measurements were available for our population of School W. They were as follows:

Height (in centimeters).
Weight (in kilograms).
Width of shoulders (biacromial).
Girth of hips (bi-iliac).

Two ratios were then computed, weight to height and width of hips to width of shoulders.

Table 53 presents the means of Wt/Ht for boys and girls of the population tested.

TABLE 53
Weight/Height Ratios

	N	Mean
Boys	89	.263
Girls	73	.257
Boys and Girls	162	.260

The correlation was then found between the Wt/Ht ratios and scores on the coöperation tests; and between the H/S ratio and coöperation.[1] These are shown in Table 54.

[1] These correlations were found by Dr. R. Bakwin in a study on body-types.

TABLE 54

CORRELATIONS BETWEEN COÖPERATIVENESS AND ANTHROPOMETRIC MEASUREMENTS

Wt/Ht Ratio	Efficiency			Free Choice	P.E.
	N	*r*	P.E.		
Boys	89	— .47	.06	.15	.07
Girls	73	— .33	.07	.00	.07
Total.....	162	— .40	.05	.08	.05
Hips/Shoulders Ratio	**Efficiency**			**Free Choice**	**P.E.**
	N	*r*	P.E.		
Boys	89	— .22	.08		
Girls	73	— .17	.08		
Total.....	162	— .20	.07		

It is evident from the above correlations that the Wt/Ht ratio and coöperation, as measured on the Efficiency test, are negatively related. Those of a high ratio (the short and heavy children) tend to be less coöperative than those of low ratio (the tall and light children).

This relationship between Wt/Ht and coöperation becomes even more apparent if we compare the ratios of those who were in the upper quartile in coöperation with those of the lower quartile.

TABLE 55

WEIGHT/HEIGHT RATIOS OF UPPER AND LOWER QUARTILES

	Mean	N	Diff.	σ Diff.	Δ/σ Diff.
Upper	.249	48	.041	.0097	4.1
Lower	.290	37			

The difference between the coöperative and the uncoöperative children in Wt/Ht ratio is quite significant. The coöperative children have a definitely lower Wt/Ht ratio than the uncoöperative ones.

There is a lower but similarly negative correlation between Efficiency coöperation and the hips/shoulders ratio. The narrow-hip-and-broad-shoulder children (masculine type) tended to be more coöperative than the narrow-shoulder-broad-hip children (feminine type).

Physical Condition

This score consisted of four physical measurements.

1. Strength of Grip. The average of three trials on a Smedley Hand-Dynamometer.
2. Lung Capacity. Three trials with a standard wet spirometer.
3. Broad Jump on a standard mat.
4. Pull up. The number of times a child was able to chin himself up. For the girls this score was substituted by the number of times of knee-raising.

Since these measures correlate with age and weight, the Character Education Inquiry worked out norms of physical condition for each age and weight level. The range of scores was thus from 40 through the normal 100, to 160.

Table 56 presents the mean scores in physical condition of those who were definitely coöperative on the Efficiency test (score above 100), of the average, and of those who were definitely uncoöperative (score below 92).

TABLE 56

Physical Condition and Efficiency Coöperation

Group	School L			School E			School W			Total		
	N	Mean	σ	N	Mean	σ	N	Mean	σ	N	Mean	σ
Coöperative	33	105.6	17.5	9	93.9	12.9	25	98.0	10.2	67	101.2	15.3
Average ..	204	107.2	17.3	174	100.7	16.1	226	98.1	16.6	604	101.9	17.1
Uncoöperative	60	106.8	16.5	19	93.9	18.3	7	97.8	13.8	86	103.2	18.3

In each of the three schools the group which was average in coöperation, i.e., worked for their class and for self at approximately the same speed, scored *highest* in physical condition. In regard to the extremes the schools differed from one another. In school L, the uncoöperative group scored higher than the cooperative group. In schools E and W, the means of the two extreme groups were identical. In the total population, however, the order of the means in coöperation is the reverse of the order in physical condition. This is partly due to heterogeneity.

School L had the highest mean in physical condition and the lowest mean in coöperation.

Physical Condition and Free Choice

Table 57 shows the physical condition score of the coöperative, the average, and uncoöperative children on the Free Choice test.

TABLE 57

PHYSICAL CONDITION AND FREE CHOICE

GROUP	SCHOOL L			SCHOOL E			SCHOOL W			TOTAL		
	N	Mean	σ	N	Mean	σ	N	Mean	σ	N	Mean	σ
Coöperative ...	39	109.9	18.5	11	97.9	17.1	35	99.9	11.9	85	105.0	16.6
Average..	187	106.8	16.8	127	100.9	16.8	150	97.5	15.6	464	102.2	16.9
Uncoöperative.	71	105.1	17.6	60	97.8	15.7	72	97.1	17.6	203	100.1	17.5

In each one of the three schools the coöperative group is higher in physical condition than the uncoöperative group, the latter group scoring lowest in physical condition. For the total population the difference between the two groups is 4.9. The difference is 2.6 in terms of its S.D.

In schools L and W, and in the total population the order of the groups in coöperation is the same as their order in physical condition. School E is the only exception. In this school the group that was average in coöperation ranked highest in physical condition.

The relationship between physical condition and coöperation varies from test to test. On the Efficiency test, the highly cooperative children do *not* score highest in physical condition. If we look at each of the populations as divided into three groups—the definitely coöperative, the average, and the definitely uncooperative, we find that the middle group (moderately coöperative) scored highest in physical condition, i.e., it is the strongest group. The most coöperative as well as the least coöperative were inferior in physical strength. On the Free Choice test, this relationship holds true for school E (well-to-do population). In the other two schools, coöperation seems to be directly related to physical condition.

It is noteworthy that this relationship is similar to the one between coöperation and the various measures of health. They correlate negatively with Efficiency coöperation and positively, though the r is low, with Free Choice coöperation.

Health Records

A set of health records was available for 278 children of school W. It gave for each child the number and kinds of diseases the child had, as well as a statement concerning general organic conditions. These records were sorted by an expert physician into a number of groups on the basis of the general condition of health which they represent. They were then separated into two groups—those of normal and those of poor health history. Table 58 shows the average coöperation scores on the Efficiency test of children having good health records and those having poor health records.

TABLE 58

Health Record and Coöperativeness

Normal Health			Poor Health			Diff.	Δ/σ Diff.
No.	Mean	S.D.	No.	Mean	S.D.		
216	98.8	3.3	62	100.5	2.8	—1.7	4.0

The group of the poor health history scored significantly higher than the normal group on the Efficiency Coöperation test. On the Free Choice test, the means of the two groups were identical.

Cleanliness

A group of 175 children of School W were examined for cleanliness. This was part of the physical examination made under the auspices of the American Child Health Association. The following spots of the body were examined and the presence or absence of "old dirt" was recorded for each: The crown section of the scalp, the forehead, area of nose and mouth, cheeks, neck, back of neck, under chin, ears, back of ears, fingers, between fingers, palms, posterior and interior wrists.

The correlation between cleanliness and coöperation on the Efficiency test was $-.088 \pm .04$. For the Free Choice test the same r is $+.240 \pm .04$. The score on the Free Choice test seems

to increase directly with hygienic appearance, while the score on Efficiency Coöperation tests is uncorrelated with it.

The scores (of uncleanliness) ranged from zero to 22. The children were then divided into three groups:

1. Zero, perfectly clean.
2. From 1 through 19, partly clean.
3. From 20 through 22, extremely unclean.

The medians of each of these groups on the two coöperation tests were then found. Table 59 presents the results.

TABLE 59

CLEANLINESS AND COÖPERATIVENESS

	No.	FREE CHOICE		EFFICIENCY
		Median	Per Cent Coöperating	Median
Clean	52	3.0	83%	100.0
Partly Clean...	119	2.3	67	99.6
Unclean	4	0.0	00	100.2

On the Free Choice test the clean group scored highest and the unclean group scored lowest. The scores on the Efficiency test seem to bear no consistent relationship with cleanliness.

It is interesting to note that a definite association was found between cleanliness and the coöperation criterion score (ratings by teachers and classmates on helpfulness). The correlation between the two was + .348. Teachers' and classmates' ratings seem to be associated with a child's cleanliness to a greater extent than are objective tests of coöperativeness. There is also a definite positive association between intelligence and cleanliness. The difference in intelligence between the clean (zero score) and all others was 3.2 its S.D.

Nutrition

This score is based on the results of an examination given by expert pediatricians to determine a child's nutritive condition. It is based on a number of health measures including the weight and amount of superficial tissue over certain muscles. The multiple R used to obtain the regression line for this score is .86, while its reliability coefficient is .95. (These scores, as well as

the following scores on teeth and vision, are from the records of the American Child Health Association which conducted an investigation on one of our populations, W.)

The correlation between nutrition and coöperation on the Efficiency test is $-.1166 \pm .05$. Those highest on this health score were somewhat low on the Coöperation test. For the Free Choice test the correlation is practically zero ($.038 \pm .05$).

The group of 153 children for whom scores were available were then divided into three groups, those within $\pm$ one S.D. from the mean, those above and those below. Their respective coöperation medians are shown in Table 60.

TABLE 60

THE COÖPERATION SCORES OF CHILDREN HIGH, AVERAGE, AND LOW IN NUTRITION

	No.	FREE CHOICE		EFFICIENCY
		Median	Per Cent Coöperating	Median
High	29	2.8	79%	97.9
Average	87	2.5	73	100.0
Low	39	1.6	58	100.4

It will be seen from this table that the relation between this health score and coöperation was different for the two tests. On the Efficiency test better nutrition went with lower cooperation, while on the Free Choice test those of best nutrition were highest in the median number of units given away as well as in the percentage of children coöperating.

Teeth

The score was based on the amount of correction needed in the teeth, the units of uncorrected caries, remaining roots, and abscesses. The objectivity of the score is .97.

The correlation between condition of teeth and coöperativeness on the Free Choice test is $+ .21 \pm .05$. Those whose teeth were in poorest condition gave the least number of work units to their classroom.

The same correlation with Efficiency coöperation was $-.114$. Those whose teeth were in best condition were less coöperative on this test.

This reversed relationship between condition of teeth and the two forms of coöperation is shown clearly in Table 61. The children are divided into three groups on the basis of the condition of their teeth. The median coöperation on each of the tests is given.

TABLE 61

CONDITION OF TEETH AND COÖPERATIVENESS

TEETH CONDITION	No.	FREE CHOICE		EFFICIENCY
		Median	Per Cent Coöperating	Median
Good	66	2.8	74%	99.3
Average	89	2.2	66	99.7
Poor	21	1.9	65	100.6

The order of three groups in condition of teeth was the same as that in the Free Choice test and reversed in the Efficiency test. (The condition of teeth also correlated with intelligence to the extent of .10.)

Vision

A group of 210 children were examined for vision on the Snellen Chart. It consisted of eighteen lines, ten letters each. The two scores for right and left eye were then added. The scores ranged from zero, extremely poor vision, to 60. Any score below 10 indicates defective vision.

The correlation between the score of vision and coöperation on the Free Choice test was $-.1641 \pm .05$. The same correlation for efficiency was $-.0516 + .05$. Evidently vision correlates slightly negatively with coöperativeness on either test. The children of extremely poor vision were the most coöperative group, as shown in Table 62. The children are divided into four groups: very poor 0-10, poor 11-25, good 26-40, and very good 41-60.

The difference in coöperativeness between the group of good vision (173 cases) and that of poor vision (38 cases) on the Free Choice test is 4.2 its S.D., and on the Efficiency test 3.4 its S. D. The median of the poor vision group is actually higher than any of the medians of the 22 classrooms of our total population.

TABLE 62

COÖPERATIVENESS AND VARIOUS DEGREES OF VISION

VISION	No.	FREE CHOICE		EFFICIENCY
		Median	Per Cent Coöperating	Median
Very Good	53	2.3	68%	99.5
Good	120	2.2	69	99.8
Poor	28	3.2	88	100.0
Very Poor	10	4.4	90	105.0

Total Score on Bodily Condition

The three health scores—nutrition, condition of teeth, and vision—were combined into one total score. They were weighted by their respective sigmas giving equal weight to each score. The final score ranged from -40 to $+40$.

The correlation between this total health score and coöperation on the Efficiency test was $-.15 \pm .05$. For the Free Choice test that correlation was zero ($.01 \pm .05$). Coöperation on the Efficiency test is inversely related to bodily condition. The lower the health score the higher the degree of coöperativeness. There seems to be no apparent association between the score on the Free Choice test and the total bodily condition. This is probably due to the combination of scores which are associated with it in opposite directions.

There seems to be a definitely negative relationship between coöperation on the Efficiency test and bodily conditions. Those of poor health, those showing a poor health history, those of poor nutritive conditions, poor vision, and poor conditions of teeth showed greater coöperativeness on this test than the normal group.

EMOTIONALITY

Two scores of emotional stability were available:

1. The Woodworth-Mathews Questionnaire.
2. Nail-Biting.

The Woodworth-Mathews Questionnaire

This test of 75 items was given to our total population (712 cases). The score of this test is generally considered a measure

of emotionality, a high score indicating emotional instability. Norms are available for different age groups.[2]

The correlations between emotionality and coöperation on the Efficiency test were positive in each of the schools. They were .20, .11, and .06 for schools L, E, and W, respectively. The more coöperative children were somewhat higher in emotionality than their classmates. On the Free Choice test the relationship was reversed. It was — .18, — .13 and — .28 for schools L, E, and W. The most coöperative children on this test were less emotional than their classmates.

The correlation between the score on this questionnaire and our total coöperation score (Efficiency plus Free Choice) was — .144 (school W).

Emotionality and Persistence of Work

The correlation between emotionality and persistence of work for self was — .10 and the correlation with persistence in work for the group was — .101. The correlation between persistence and emotionality tends to be negative. High persistence seems to be associated with low emotionality.

Nail-Biting

The physical examination given to one of our schools, school W, by the American Child Health Association, included this item. A record was made as to whether or not a child bit his nails and the number of nails bitten. Such records were available for 175 children of our population. Twenty-seven per cent of the children examined were found to have the habit of nail-biting. Sixty-two per cent of the latter bit all their nails, while the rest bit only one or two nails.

The children were divided into three groups:

1. Those who did not bite their nails at all.
2. Those who bit some of their nails (usually one or both thumbs).
3. Those who bit all their nails.

The median score of each of these groups on the two tests was then found. Table 63 presents the results.

The extremely emotional children (biting all nails) were

[2] See "A Study of Emotional Stability in Children," by Ellen Mathews, in the *Journal of Delinquency*, Vol. VIII, No. 1, Jan. 1923, pp. 1-40.

TABLE 63

NAIL-BITING AND COÖPERATIVENESS

NAILS BITTEN	NO.	MEDIAN	PER CENT COÖPERATING	EFFICIENCY
None	126	2.6	71	99.5
Some	18	2.8	89	100.7
All	29	2.2	62	99.8

slightly more coöperative in the Efficiency test than those who bit none of their nails. On the Free Choice test the reverse held true. Those who bit all their nails were less coöperative than those who did not.

On each test, however, the middle group was the most cooperative one.[3]

The nail-biting group was also inferior to the non-nail-biting group in intelligence, in coöperation criterion score, in neurotic index, in honesty, persistence, and inhibition. The medians of the three groups on each of the above measures are shown in Table 64.

TABLE 64

NAIL-BITING AND OTHER CHARACTER MEASUREMENTS

NAIL BITING	N	INTELLIGENCE	COÖPERATION CRITERION	NEUROTIC INDEX	HONESTY	PERSISTENCE	INHIBITION
None	126	50.3	5.7	13.4	—8.9	156	13.5
Some	18	48.8	7.7	20.5	—7.0	655	12.0
All	29	47.7	4.3	23.8	—13.0	104	11.5

The bi-serial correlation between nail-biting and neurotic index (Woodworth-Mathews Questionnaire) was .38.

It is curious to note that the group (18 children) biting some of their nails (usually one) was superior to the other two groups in coöperation, criterion of coöperation, honesty, and persistence.

[3] One of the items (No. 20) of the Woodworth-Mathews Questionnaire reads: "Do you ever make your fingers sore by biting your nails?" Now for these children we had both the children's answer to this question and the objective score whether or not a child actually had bitten his nails. The four-fold r between the two was .84. There were only two boys and eight girls who answered that item negatively and who were in the habit of nail-biting. It is noteworthy that each one of those 10 children who deliberately lied about the habit of nail-biting scored below the mean in coöperativeness, and above the mean in deception and in emotional instability on the Woodworth-Mathews Questionnaire.

CHAPTER IX

EXTRA-CURRICULAR ACTIVITIES

Attendance at Moving Pictures

Each child was given the question, "How many times a week do you go to the movies?" (This is one item in the Pupil Data Sheet of the Character Education Inquiry.)

On the basis of their answers the children were divided into six groups, those who said they never or very seldom go to the movies, those who go once, twice, three, four, five, or more times per week. These scores were then correlated with the scores on the tests of coöperativeness. The results are presented in Table 65.

TABLE 65

The Correlation Between Attendance at Movies and Coöperativeness

School	N	Free Choice		Efficiency	
L	269	—.10	.04	—.13	.04
E	188	—.16	.05	—.28	.05
W	233	—.24	.04	—.10	.04
Total	690	—.17	.02	—.20	.02

Each of the tests shows a low but consistently negative correlation between frequency of attendance at movies and cooperation. This holds true for every one of the three schools.

Table 66 presents the average coöperation scores of each of the six groups classified according to the frequency of their attendance at movies.

Those who attended movies less often seem to be the more cooperative children. The group attending movies about once a week had the highest percentage of children coöperating. There was, however, considerable difference between the schools in this respect.

In school E those who had the highest movie attendance had

TABLE 66

MOVIE ATTENDANCE AND COÖPERATION

WEEKLY MOVIE FREQUENCY	No.	FREE CHOICE		EFFICIENCY
		Median	Per Cent Coöperating	Coöperation Median
5	18	2.2	67%	94.3
4	34	2.3	67	95.5
3	74	2.5	69	95.6
2	161	2.7	73	97.1
1	307	2.6	86	97.9
0	97	2.6	83	99.1

the lowest coöperation score on both the Free Choice and the Efficiency tests. Those who went to the movies less than once a week were highest on one test and second highest on the other.

In school L, those whose movie score was less than once per week were highest on both tests. The order of the groups in percentage of children coöperating in schools L and W is definitely the reverse of their order in frequency at movies. The group of highest frequency have the lowest percentage of children who coöperated on the Free Choice test.

The means of both Efficiency and Free Choice do not show as definite a relationship as the percentage coöperating. In each of the schools there seems to be a point in the movie frequency score above which the children are definitely less coöperative. At school L, it is two or above; at schools E and W, it is above two.

The difference in critical point is probably due to environmental differences. The children in schools E and W come from homes of better means and probably have more spending money. Attendance of movies is encouraged by the neighborhood movie. The mean of attendance is therefore higher and the critical point is higher. The reverse is true of school L. Each population was divided into two groups, those attending movies frequently and those attending normally. Tables 67A and 67B present the means of coöperativeness for the two groups.

The second from the last column in Tables 67A and B gives the difference between the means in terms of the S.D. of the difference. The last column gives the percentage of the "frequent" group reaching the median of the normal group.

TABLE 67A

MOVIE ATTENDANCE AND COÖPERATIVENESS

THE EFFICIENCY COÖPERATION TEST

SCHOOL	NORMAL		FREQUENT		DIFF.	D/σD	PER CENT OVERLAPPING
	Mean	σ	Mean	σ			
L	96.5	6.7	94.8	8.1	1.7	1.9	40.9
E	97.8	4.0	96.1	5.5	1.7	2.0	32.4
W	99.9	2.8	99.0	4.2	0.9	1.8	45.5
Total.....	98.2	4.9	96.3	7.0	1.9	4.0	44.7

TABLE 67B

MOVIE ATTENDANCE AND COÖPERATIVENESS

THE FREE CHOICE TEST

SCHOOL	NORMAL			FREQUENT			DIFF.	D/σD	PER CENT OVERLAPPING
	PER CENT COÖPERATING	Mean	σ	PER CENT COÖPERATING	Mean	σ			
L	78	2.9	2.0	76	2.6	1.8	0.3	1.2	45.0
E	70	2.2	1.7	63	1.5	0.9	0.7	2.9	39.7
W	74	2.9	2.1	71	2.2	1.6	0.7	2.0	34.7
Total.....	75	2.7	2.0	71	2.3	1.7	0.4	2.3	42.7

The foregoing table indicates clearly that those attending movies more frequently than the average were less coöperative on each one of the tests. This holds true for each of our three schools. Of course this does not indicate that frequent movie attendance is the cause of less coöperativeness. There are numerous other factors which are associated with movie attendance. One of these is intelligence, as shown in Table 68.

The medians of intelligence decrease consistently with increase in average movie attendance. The zero group is the only exception. In two out of the three schools those who attended no movies were of lower intelligence. The correlation between intelligence and movie frequency (school W) is — .30 and the difference in intelligence between the frequent and normal groups is 4.7, in terms of the S.D. of the difference.

Frequency of attendance at movies seems to be negatively related to coöperativeness. This holds true for each population

TABLE 68

INTELLIGENCE AND ATTENDANCE AT MOVIES

MOVIE FREQUENCY	SCHOOL L		SCHOOL E		SCHOOL W	
	N	Median	N	Median	N	Median
4 or more.....	36	42.2	7	45.0	11	42.4
3	40	43.4	12	49.0	16	42.7
2	68	46.6	26	49.0	65	46.8
1	104	46.0	97	50.9	107	49.0
0	14	44.0	47	51.9	41	47.5

and for each of the coöperation tests. Populations differ in the critical point above which children are definitely less coöperative. In one school, school L, those who attend on the average once, or less than once, a week are the most coöperative group. In schools E and W, those who attend twice a week or less are the best group.

Both in the degree of coöperation as well as in percentage of children coöperating, those attending movies more than twice a week were more selfish than their classmates.

EMPLOYMENT AND COÖPERATIVENESS

The children were asked whether they do any regular work for which they earn some money. In school E there were 110 children earning money in one way or another, and 51 children who earned no money. Table 69 gives the scores of the two groups on each of the tests.

TABLE 69

EMPLOYMENT AND COÖPERATIVENESS

	N	FREE CHOICE	PER CENT COÖPERATING	EFFICIENCY
Earning Money	110	1.8	67%	97.8
Not Earning Money.	51	2.2	80	98.6

It appears that on each one of the tests the group that did not earn money was somewhat more coöperative. The money-earners were probably more inclined toward *competition* than toward coöperation. It is noteworthy that the working group was also lower than the non-working group in intelligence (their

respective medians were 50.3 and 51.3) and in the coöperation criterion ratings by teachers and classmates (their respective medians were 4.7 and 5.1).

Club Membership

Do children who are members of such organizations as the Boy Scouts, Girl Scouts, etc., differ in coöperativeness from those who do not belong to such organizations? The information regarding affiliation with such organization was obtained through the following question: Do you belong to any club, Boy Scout, etc.? Give name, name of leader, hour of meeting, etc. The veracity of the answers, as far as the Boy Scouts are concerned, was checked by the headquarters of the Boy Scout organization. The median score of each club group on the two coöperation tests was found. Table 70 presents the averages for club members and non-club members of our total population.

TABLE 70

Club Membership and Coöperativeness

	N	Free Choice Test		Efficiency Median
		Median	Per Cent Coöperating	
Boy Scouts	62	2.8	81%	99.0
Boys, Other Clubs	21	2.5	69	98.6
Boys, All Club Members	83	2.7	75	98.7
Boys, Non-Club Members	194	2.0	62	98.9
Girl Scouts	38	2.3	82	99.0
Girls, Other Clubs	37	2.5	85	98.8
Girls, All Club Members	75	2.4	84	98.8
Girls, Non-Club Members	194	1.9	68	98.5
Total Club Members	158	2.5	79	98.8
Total Non-Club Members	388	2.0	65	98.7

The Boy Scouts were more coöperative than the boys non-scouts on each of the tests. The Girl Scouts were superior to the girls non-club members on both tests. Comparing all club members with all non-members the former are definitely superior in percentage coöperating and in average score on the Free Choice test and slightly superior on the Efficiency Coöperation test.

The relation between club membership and coöperation differed somewhat from school to school. This is shown in Tables 71A, 71B, and 71C.

In school E, the Boy Scouts and the Rangers are superior on each of the tests to the boys, non-scouts, of the same school.

The Camp Fire Girls and the Girl Scouts are superior to the other girls only on one of the tests.

TABLE 71A

CLUB MEMBERSHIP AND COÖPERATION, BY SCHOOLS. SCHOOL E

CLUBS	N	FREE CHOICE TEST		EFFICIENCY MEDIAN
		Median	Per Cent Coöperating	
Boy Scouts	18	1.8	78	99.0
Rangers	3	2.5	100	100.8
Y. M. C. A.	7	0.7	29	97.5
Girl Scouts	9	1.7	89	99.3
Camp Fire Girls	19	2.6	90	97.6
Girl Reserve	5	2.2	80	97.5
Boys, Club Members	28	1.6	68	98.7
Girls, Club Members	33	2.3	88	97.8
All Club Members	61	2.0	79	98.2
Total Boys	114	1.3	72	98.5
Total Girls	107	2.2	73	97.2
Total Boys and Girls	221	1.8	73	97.9

TABLE 71B

CLUB MEMBERSHIP AND COÖPERATION, BY SCHOOLS. SCHOOL L

CLUBS	N	FREE CHOICE		EFFICIENCY MEDIAN
		Median	Per Cent Coöperating	
Boy Scouts F	8	3.4	88	93.5
Boy Scouts G	3	3.5	67	95.5
Boy Scouts F and G	11	3.4	82	94.0
Total Boys F	22	3.6	85	95.3
Total Boys G	24	1.0	47	95.0
Total Boys F and G	46	2.3	66	95.2

TABLE 71C

CLUB MEMBERSHIP AND COÖPERATION, BY SCHOOLS. SCHOOL W

CLUBS	N	FREE CHOICE		EFFICIENCY MEDIAN
		Median	Per Cent Coöperating	
Boy Scouts	33	3.1	82	99.9
Lone Scouts	8	2.0	75	99.4
Christian Endeavor	12	3.0	67	100.4
Girl Scouts	29	2.5	79	98.9
Girls League	3	3.5	100	100.8
Boys Club Members	44	3.0	76	99.6
Girls Club Members	42	2.5	80	99.7
All Club Members	86	2.8	78	99.7
Total Boys	141	2.6	73	99.4
Total Girls	138	2.1	73	98.5
Total, Boys and Girls	279	2.5	73	99.0

In school W the Christian Endeavor children and members of the Girls League are superior on both tests. The Boy Scouts and the Girl Scouts are superior on both tests. The Lone Scouts are inferior on both tests.

In school L there were few children belonging to clubs. In the two sections F and G of Grade VIII were found 8 and 3 Boy Scouts, respectively. Group F is one of the best and Group G one of the poorest groups in that school, as indicated by their means on most of the objective tests. Now it is noteworthy that in Group F the Boy Scouts were somewhat inferior to the non-scouts, while in Group G they were definitely superior.

The club members scored higher in coöperation than the non-members in every one of the schools (E and W) and on each of the tests. The differences are most probably the result of selective factors in operation rather than changes brought about by the club membership. The means of club members of different groups seem to be more alike than those of non-members of different groups. The sex difference in the latter is larger.

CHAPTER X

THE ENVIRONMENT

The marked differences in coöperativeness among our three populations indicate the influence of the general environment or community. The children of school W, the small town community, were definitely superior to those of the other two schools. The well-to-do population E ranked second, while the underprivileged children of school L ranked third.[1]

The Home

The extent of home influence was investigated from two angles:

1. Testing children coming from the same home, and children and their parents, and determining the amount of resemblance within the family.
2. Measuring some of the actual factors involved in the home environment and finding the association between those factors and scores on our tests.

Four measures of home influence were available.

Resemblance of Siblings

There were 134 pairs of siblings in our population. On the basis of the family as the unit, the scores of the siblings were correlated with one another, each pair being entered twice in the scattergram. The correlations between the scores of siblings for Speed of Work was .4917, for Efficiency Coöperation, .1910, for Free Choice Coöperation, .06, for Persistence in Work for Self, .1730, and for Persistence in Work for the Group, .2422. For the combined score Efficiency, Free Choice and Vote, the r was .40.

Siblings seem to resemble each other in mere speed of work to about the same degree as in intelligence. Their resemblance in the Efficiency Coöperation test involving speed is also much

[1] See Chapter XIII for hypothetical explanation of population differences.

higher than in the Free Choice test. The resemblance in persistence of group work is higher than in persistence of self work.

These correlations though they reveal resemblance and the presence of common factors do not indicate the degree to which those common factors are biological and environmental. Such factors as age, intelligence, social status, school morale, and the like would have to be analyzed before conclusions could be drawn concerning the nature of the resemblance.

Parents' Intelligence and Moral Knowledge

The Character Education Inquiry succeeded in administering a short intelligence test and a test of moral knowledge to the parents of 218 children. The correlations between the father's intelligence and the child's scores on Efficiency and Free Choice tests were $.10 \pm .04$ and $.17 \pm .04$, respectively. The same correlations with the mother's intelligence were $.13 \pm .04$ and $.18 \pm .04$. The correlations between the father's moral knowledge score and the child's score on the Efficiency and Free Choice tests were $.11 \pm .04$ and $.14 \pm .04$. The same correlations with the mother's moral knowledge scores were $.12 \pm .04$ and $.16 \pm .04$.

Coöperativeness of Parents

The parents were asked to fill out certain blanks giving information concerning their children's behavior in the home. The parents of 218 children returned the blanks to the Character Education Inquiry with the required information while the parents of 544 children did not take the trouble to do so.

The scores of the children of these two groups of parents were then compared. The children of the helpful parents scored higher. The difference between the means in terms of its S.D. was 2.2 on the Efficiency test and 3.1 on the Free Choice test.

Four additional factors of the immediate environment were investigated: The occupation and social status of parents, the size of the family, and the cultural home background.

Occupation of Parents. The occupations were classified by the Character Education Inquiry, according to a modification of the Taussig scale, in five groups: 1. Professional, 2. Commercial, 3. Skilled laborers, 4. Semi-Skilled laborers, and 5. Unskilled laborers.

Table 72 shows the number and percentage of cases falling in

TABLE 72

DISTRIBUTION ACCORDING TO OCCUPATIONAL LEVEL

OCCUPATION	SCHOOL L		SCHOOL E		SCHOOL W	
	N	Per Cent	N	Per Cent	N	Per Cent
1	2	.7	62	30.0	9	3.9
2	17	6.3	59	28.5	41	15.6
3	54	19.8	64	30.9	110	42.0
4	177	65.2	19	9.2	85	32.5
5	22	8.1	3	1.4	17	6.5

each occupational group for each of the three schools of our population.

School L had less than one per cent in the professional group. Group I will therefore be omitted from this school in the later tables.

Table 73 presents the median coöperation scores of each occupational group.

TABLE 73

OCCUPATIONAL LEVELS AND COÖPERATION

OCCUPATION	SCHOOL E				SCHOOL L			
	N	Free Choice	Per Cent Coöperating	Efficiency	N	Free Choice	Per Cent Coöperating	Efficiency
1	57	1.7	72	97.9	—	—	—	—
2	60	1.9	70	98.1	16	3.2	88	98.6
3	63	1.9	65	98.4	44	2.4	82	97.9
4	13	1.8	69	97.5	164	2.8	76	97.5
5	5	0.7	40	95.5	20	2.6	75	95.6

On the Efficiency test there is a direct and definite increase in coöperation with the increase in occupational level in school L. In school E the relation between the two is not as definite. Those of occupation 1 have a median which is lower than the median of those of occupation 3.

The percentage coöperating on the Free Choice increases directly with occupational level in each of the schools. The median score, however, is only slightly related to occupational level. There seems to be a marked difference between the schools.

In population E, generally high in social status, those of the highest occupation are next to the very lowest occupation in cooperativeness. On the other hand, in school L, of low social level, the highest occupation has definitely the highest score. It seems as if above a certain social level, coöperativeness is on a decrease rather than increase.

Social Status

Another measure of the environment was the Sims Score Card. This test was given to schools E and W. It is a measure of the social economic level of the family. The score is based on such items as the number of books in the house, possession of a telephone, a bathroom, etc.[2] In school E the correlation between social status and coöperation was negative: $-.18 \pm .04$ with the Efficiency test and $-.12 \pm .04$ with the Free Choice test. In school W these correlations were low but positive: $+.10$ with the Efficiency test and $+.14$ with the Free Choice test.

The Number of Children in the Family and Its Relation to Coöperativeness. The children were asked to state the number of their brothers and sisters and the name of each. A score was then available for the number of children in the family. The children were divided into five groups: the "only" child, those having one or two, three or four, five or six, and those having more than six brothers and sisters.

TABLE 74

Size of Family and Coöperativeness

School	L		E		W	
No. of Siblings	No.	Per Cent Coöperating	No.	Per Cent Coöperating	No.	Per Cent Coöperating
Above 6	25	76	13	62	15	80
5-6	65	72	18	56	32	84
3-4	79	83	28	75	41	83
1-2	80	79	109	69	134	69
Only Child ...	46	71	53	61	54	63

Table 74 indicates the following:

1. The group of "only" children had the lowest percentage of children coöperating in each of the schools.

[2] See *The Measurement of Socio-Economic Status*, by V. M. Sims, Public School Publishing Company.

2. Those having three or four siblings (coming from families of four or five children) are the most coöperative group. Those having a smaller number or a larger number of siblings were less coöperative. This holds true for each of the three schools.

3. Coöperativeness increases with the number of siblings and then decreases with it. The relationship between the two variables is curvilinear.

No definite relationship was found between the number of brothers and sisters and coöperation on the Efficiency test, except that the "only" child group had the lowest coöperation average.

A negative relationship was observed between the number of children in the family and the intelligence of the children. This is shown in Table 75.

TABLE 75

INTELLIGENCE AND THE NUMBER OF CHILDREN IN FAMILY

School	L		W	
No. of Children	No.	Med.	No.	Med.
Above 7	25	40.7	15	45.2
6-7	65	44.6	32	48.0
4-5	79	45.5	41	46.0
2-3	80	48.0	134	49.0
Only Child	42	46.3	54	46.0

In each of the schools those who had one or two siblings (two or three children in family) were of highest intelligence. Those who had more than six siblings were of lowest intelligence.

Cultural Background

A child's cultural background was measured by the Burdick Apperception test. The score on that test is based on such cultural factors as the child's familiarity with nature, music, art, literature, etiquette; on such economic factors as living conditions, income, number of family members working, and their occupations; on the recreational facilities of the child, division of labor in the home, and such factors as affiliations with religious bodies, religious instruction, relationship toward parents, etc.[3]

[3] See Burdick, E. M., *Archives of Psychology*, No. 101, 1928.

The correlation between cultural background and coöperation was positive, .19 ± .02 with the Efficiency test and .24 ± .02 with the Free Choice test.

The Class Morale

The means of various classrooms within the same school differed considerably from one another. Several methods were used in determining whether they were true differences, and not due to chance fluctuations.

1. The members of each classroom were divided into two sub-groups and the resulting pairs of means were correlated. Now if the classrooms were random samplings of the population, the *r* should have been zero. Actually it was .60 and .92 for the Efficiency and Free Choice tests, respectively. The correlations indicate the existence of certain factors influencing the behavior of each classroom so that any two sub-groups of it would tend to resemble one another.

2. Another method consisted of finding the ratio of the S.D. of the various group means to the mean of the S.D.'s of those groups. If the classrooms were random samplings of the total population, then this ratio should not be larger than 1. The actual ratios found for the Efficiency test were 1.72 and 3.17 in schools W and L, respectively. For the Free Choice test, the similar ratios were 1.94 and 1.72.

3. Even when school and grade were kept constant, there were still significant differences between classrooms.[4]

The above considerations lead to the conclusion that there was such a factor as class morale influencing the behavior of the members of each particular classroom.

Children's Associates

Resemblance of Friends in Coöperativeness

One of the items of the Character Education Inquiry Pupil Data Sheet asked for the names of a child's friends. Each child named (about) four friends. As most of the friends named were in the same school their scores on our test were available. A study was then made of the degree of resemblance between a child's score and the score of the first-named friend. The cor-

[4] See detailed tables filed in the Library of Teachers College, Columbia University.

relations between friends on our total coöperation scores were found for schools L and E. The *r*'s were .165 and .202, respectively. Considering friends of the same classroom only, the correlations were .3178 and .1997, respectively.

Mutual Friendship. There were cases where the naming as a friend was mutual. These probably represent stronger bonds of friendship than where the reference was only on one side. There were 40 pairs of mutual friends in school E and 104 such pairs in school L. The correlation between the coöperation scores of these friends in schools E and L were .228 and .466, respectively. These correlations are higher than for non-mutual friends. The degree of resemblance seems to increase with the degree of friendship.

Resemblance Between Friends in Persistence of Work. The correlations between scores of friends in persistence (the sum of persistence in self work and in group work) for schools L and E were .124 and .201, respectively.

Number of Friends and Coöperativeness

The children were asked to name their close friends. The number of times each child was mentioned as a friend (by other children) was then found. It is evidently an objective way of determining, from the point of view of others, how social a child is, to what degree classmates consider him or her a friend. It differs from the ordinary method of asking the child to give the number of friends he has and taking that number as a measure of sociability [67]. The averages are presented in Table 76.

TABLE 76

THE MEANS OF POPULARITY FOR BOTH SEXES

School	N	Mean	S. D.	Boys			Girls		
				N	Mean	S. D.	N	Mean	S. D.
L	312	3.1	2.1	162	2.8	1.9	150	3.5	2.3
E	221	2.9	2.0	107	2.9	2.1	114	3.0	1.8
W	279	3.3	2.3	138	3.2	2.4	141	3.4	2.3
Total	812	3.1	2.2	407	3.0	2.1	405	3.3	2.2

The average child was given as a friend by 3.1 classmates. The girls scored consistently higher in popularity than the boys.

In school E the correlation between this score and coöperation

on Free Choice was .12 (.14 for boys and .09 for girls). In the other two schools the correlation was zero.

Curvilinearity of Relationship. An inspection of the scattergram revealed a curvilinear relationship between number of friends and coöperativeness.

The children of each school were divided into three groups on the basis of the number of friends: popular (those whose names were given as friends by eight or more children); average in popularity; and unpopular (those who were not mentioned by a single child as a friend). The average coöperation scores of each of these groups are presented in Table 77.

TABLE 77

POPULARITY AND COÖPERATIVENESS

	N	EFFICIENCY COÖPERATION	FREE CHOICE
Popular	26	96.3	1.5
Average	640	98.2	2.3
Unpopular	125	97.4	1.8

It is seen from the above table that those who had an average number of friends were the most coöperative group. Those who were very popular (more than 8 friends) as well as those who were very unpopular (zero friends) were less coöperative on each of the tests.

Those who were less coöperative had a larger S.D. of number of friends. They comprise both extremely popular and extremely unpopular children thus having a larger variation (See Chapter XI). The difference in S.D. was 3.2 in terms of its own standard deviation.

Intelligence and Number of Friends. The correlation was found between intelligence and the number of times a child was given as a friend (for school E). This correlation was zero (.002).

The population was divided into three groups on the basis of popularity: those scoring above $+1$ S.D. from the mean ($N = 35$); those within ± 1 S.D. from the mean ($N = 159$); and those scoring 1 S.D. below the mean. These will be called popular, average, and unpopular, respectively. Their medians of intelligence were 49.5, 51.5, and 49.0, respectively.

The group having an average number of friends was the highest in intelligence. The extremely popular were of lower intelligence and the extremely unpopular were of lowest intelligence.

Resemblance of Partners

In two classrooms ($N = 72$), the children were told to choose partners and then work in partnerships (see Chapter XI for description). It was then possible to compare the scores of partners and to correlate the coöperation score of one against that of the other member of a pair. The correlation was .447 ± .06.

This correlation indicates a higher degree of resemblance between partners than between siblings and is much higher than the resemblance between friends. It should be remembered that the partnerships were chosen for the purpose of working together on a task very similar to that of the coöperation test. It is this specificity of choice that is probably the cause of the high degree of resemblance. As the coöperation test was given a day before the partnerships were chosen, there was no possible direct effect of being partners. It rather indicates that either children tend to choose as partners those who are very much like themselves in coöperation, or that children who choose one another as partners behave similarly on such tests as ours.

Influence of Dominant Sub-Groups

An inspection of the means of twenty-two classrooms showed that the sex difference on each of the tests varied from classroom to classroom. It differed in both magnitude and direction. Is the relative size of a sex group associated with its relative coöperativeness, or uncoöperativeness? The percentages of boys within the various classrooms were correlated with the ratios of the median boys to the median girls. (r NB/NB + G, Med. B/Med. G). This correlation was .759 for the Efficiency scores and .222 for the Free Choice scores. It appears, then, that the sex group which is in a majority tends to be the more coöperative of the two. The dominating majority probably is more motivated and more ready to coöperate with the class than the minority group.[5]

[5] If instead of the percentage NB/NB + G, we use the ratio of the number of boys to the number of girls the correlation is even higher. The r NB/NG, Med. B/Med. G = .875, for the Efficiency test and .340 for the Free Choice test.

National Differences in Coöperation

Among the items of the Character Education Inquiry Pupil Data Sheet which was administered to the children of schools E, L, and W, were the questions: "In what country was your father born?" and "In what country was your mother born?" Of the 814 children, *431* were of native parents, *199* of foreign-born parents, and *71* of mixed parentage (one parent native and the other foreign). More than 20 countries and combinations were mentioned. Most of these, however, represented too small numbers to warrant separate calculations.

A difference in scores on our coöperation tests between nationalities may well be the result of a difference in environment. The differences to be presented are, therefore, far from indicating isolated national characteristics of behavior.

Table 78 presents for the total population the median scores on the Efficiency test, on the Free Choice test, and the percentage

TABLE 78

National Differences in Coöperativeness

Nationality	N	Efficiency	Free Choice	Per Cent Coöperating
United States	426	99.1	2.2	72
U. S. and Foreign	71	98.3	2.5	77
Foreign	200	96.9	2.4	72
Slavic and U. S.	12*	100.0	2.0	58
Scandinavian and U. S.	4	99.0	3.0	50
English and U. S.	11	98.5	3.6	100
German and U. S.	17	98.3	2.6	87
Italian and U. S.	13	98.3	1.3	54
Irish and U. S.	12	97.0	2.0	83
English	5	99.0	3.5	80
French	6	99.0	3.0	67
Irish	26	98.5	2.3	69
Scandinavian	3	97.0	4.5	100
German Austrian	18	96.8	2.4	67
Slavic	56	96.7	2.7	78
Italian	74	95.8	1.9	68
No Record	114	97.3	2.8	71

* Most of these are Jewish, one parent born in Russia or Poland, and the other in the U. S.

of children coöperating on the Free Choice test, for each national group. U.S. means that both parents of the child tested were born in the United States, etc. The table indicates the following:

The Efficiency Test

1. The United States group was the most coöperative and the foreign group the least coöperative.
2. Of the foreign groups those of Italian parents were the least coöperative, while the English and French were the highest (only 28 per cent of the Italian group reached the median of the United States group).
3. Of the mixed group the Irish and United States are the lowest while the Slavic and United States (mostly Jewish) and the Scandinavian and United States are highest.

The Free Choice Test

1. The mixed group scored highest and the United States group lowest.
2. Of the foreign group the Italians are again the lowest while the Scandinavian and English score again highest.
3. Of the mixed group the Italian and United States is the lowest while the English and United States and Scandinavian and United States are again highest.

There is considerable consistency in the ranking of the nationalities on the two tests. (The tests correlate only .20.) The United States group, a marked exception, is high on the Efficiency test and low on the Free Choice test. It will be recalled that the latter test requires the giving away to the group of some work units which, when withheld, might lead to a personal prize. The United States group, probably more ambitious and more competitive than the others, tended to a greater extent to withhold the work for personal gain. On the Efficiency test, which involved no open conflict with personal interest, this group was quite coöperative.

The various nationalities were represented in the three schools in varying proportions. The schools differed radically from one another in coöperativeness. What appears to be a national difference may really be the result of difference in school and general environment. It is therefore necessary to compare national

groups of the same school. Tables 79A and B present the data for each of the three schools for the native, mixed, and foreign groups.

TABLE 79A

National Differences in Coöperativeness, by Schools
The Efficiency Test

School	L		E		W	
Nationality	N	Median	N	Median	N	Median
United States	87	97.8	131	98.5	208	99.9
United States and Foreign	27	98.5	22	96.5	22	99.3
Foreign	150	96.5	27	97.8	23	98.4

TABLE 79B

National Differences in Coöperativeness
The Free Choice Test

School	L			E			W		
Nationality	N	Median	Per Cent	N	Median	Per Cent	N	Median	Per Cent
United States	86	2.6	75	136	1.7	69	209	2.5	74
United States and Foreign	28	2.8	86	21	1.8	57	22	3.0	86
Foreign	149	2.4	74	27	2.3	70	23	1.9	65

TABLE 80

Differences Between Three Religious Groups in Coöperation on the Free Choice and Efficiency Tests (School E)

Religion	Free Choice				Efficiency Coöperation	
	N	Per Cent Coöperating	Mean	S. D.	Mean	S. D.
Catholic	61	64	1.7	1.2	96.9	5.5
Jewish	42	71	2.0	1.4	97.0	6.9
Protestant	118	69	2.2	1.9	97.8	5.5

In each one of the three schools, the foreign group was the least coöperative on the Efficiency test; the native group was the most coöperative in two schools and only slightly below the United States and Foreign in the third.

In two schools the United States and Foreign group was highest on the Free Choice test, and in the third school the Foreign group was highest.

The difference in status of some nationalities in the various schools indicates that the differences in coöperation are, to some extent, the result of selection rather than genuine national differences.

The Jewish group had the highest percentage of children cooperating, the Protestant group attained the highest median on either test, and the Catholic group had the lowest percentage coöperating and the lowest median on both tests.

CHAPTER XI

A DETAILED STUDY OF FOUR HUNDRED CASES

The children of the upper quartile (204 cases) and the lower quartile (208 cases) on the Efficiency Coöperation test were chosen for a detailed study. In order to eliminate the factor of heterogeneity, the upper and lower quartiles of each class, rather than that of the total population, were considered. The interquartile range of each classroom was removed. The upper quartiles of our twenty-two classrooms were then put together into one group. The lower quartiles were similarly formed into one group. The upper 204 cases represent those children who tended to work for their group at even a higher efficiency than for themselves; they were coöperative rather than competitive. These will be referred to as the coöperative group. The lower 208 children worked for their group at a definitely lower efficiency; they were competitive rather than coöperative. They will be referred to as the competitive group.

A careful study was then made of the scores of these two groups on each of sixty-six sets of scores which were available for our population on the records of the Character Education Inquiry. The medians, means, and S.D.'s of the two groups were then computed on each one of the scores. The difference between the means was uniformly expressed in terms of the S.D. of the difference and the difference between the medians was expressed in terms of the overlap, the percentage of one group reaching or exceeding the median of the other group.

The sixty-six scores on which comparisons will be presented were divided into eight groups.

A. Reputation: ratings by teachers and classmates on co-operativeness, helpfulness, etc. (7 scores)
B. Records of behavior.
   1. Objective records of helpfulness. (4 scores)
   2. Records of persistence. (3 scores)

3. Records of inhibition. (3 scores)
4. Records of honesty. (6 scores)

C. Records of age, intelligence, and scholastic status. (8 scores)

D. Measures of physical strength, health, and emotionality. (11 scores)

E. Moral knowledge and social intelligence. (4 scores)

F. Attitude toward work, at school, home, etc. (4 scores)

G. Extra-curricular activities, movies, clubs, play, Sunday school, etc. (5 scores)

H. Home and environment. (11 scores)

A. Reputation

Table 81 presents a comparison between the competitive and coöperative groups on seven criterion scores. The first one is the criterion of coöperativeness. It is the total rating on helpfulness by classmates and teachers. The second is a general rating by teachers; the third is a similar rating by classmates; and the fourth is the total rating. The last three scores are ratings on honesty, persistence, and inhibition, respectively. Each of these three ratings is the composite of classmates' and

TABLE 81

Comparison of the Competitive and Coöperative Groups in Ratings by Teachers and Classmates

	Competitive			Coöperative			Diff.	σ Diff	D/σD	Per Cent Overlap
	N	Mean	S. D.	N	Mean	S. D.				
Coöperation, Criterion ..	186	1.5	12.0	183	6.0	9.2	4.5	1.11	3.2	69.8
Coöperation, Teachers ..	195	21.9	78.0	185	44.7	73.2	22.8	7.76	2.9	59.2
Coöperation, Classmates..	185	3.2	17.2	160	5.1	16.5	1.9	1.82	1.0	54.6
Reputation, Total	167	70.3	29.2	162	74.5	27.5	4.2	3.13	1.3	53.0
Honesty, Criterion ..	172	63.4	25.4	165	68.9	22.9	5.5	2.63	2.1	54.0
Persistence, Criterion ..	170	1.6	6.1	173	1.6	5.8	0.0	...	0.0	50.6
Inhibition, Criterion ..	190	1.3	9.6	186	3.7	9.0	2.4	.96	2.5	60.3

teachers' opinions. (For description of the ratings by associates see [62] and Chapter V.)

Table 81 reads as follows: On the total criterion of cooperativeness the coöperative group had an average score of 6.0 while the average of the competitive group was 1.5. The difference in terms of its S.D. is 3.2. Seventy per cent of the cooperative group reached or exceeded the median of the competitive group. The other lines read similarly.

The coöperative group is definitely superior on the coöperation criterion. The difference between the two groups is significant.

The coöperative group was also rated higher on honesty, on inhibition, and on general character by both teachers and classmates. There was no difference between the groups in rating on persistence. It was superior on all the other ratings.

This suggests either of the following two possibilities:

1. Teachers and classmates are to a large degree influenced by a general impression concerning any individual to be rated. They tend therefore to rate a child uniformly either "good" or "bad." This is often called the halo effect.

2. The coöperative group may be actually superior in the "traits" on which rating was done.

The second hypothesis is somewhat substantiated by the general superiority of the coöperative group on most of the objective records of behavior on tests of honesty and inhibition. In fact, the relative status of the two groups on the various ratings bears a close relationship to their status on the corresponding objective tests.

The comparison between the competitive and coöperative groups in score on the criterion of coöperativeness was worked out separately for each of the schools. This was to serve as a check on the consistency of the difference.

In each of the schools the coöperative group scored higher on the coöperation criterion. It was found that the difference between the two groups was greatest in the least coöperative school (L) and smallest in the most coöperative school (W). The agreement between objective tests and a rating by associates on coöperation appears to be inversely related to the average degree of coöperativeness within the population.

Sex Difference

It is noteworthy that the difference in total reputation between boys and girls is larger than the difference between the coöperative and competitive groups. The boys of the coöperative group have a lower reputation average than the girls of the non-coöperative groups in each of the schools. Furthermore, the difference in reputation between the two groups (competitive and coöperative) is larger for the girls than for the boys.

Similarly in the ratings on helpfulness the girls were rated consistently higher than the boys. The superiority of the girls in reputations appears in both the competitive as well as the cooperative group, and in each of the three schools. (Table 82.)

TABLE 82

Comparison Between the Two Groups in Ratings by Sex

	Sex	Competitive			Coöperative			Diff.	σ Diff.	D/σD
		N	Mean	S. D.	N	Mean	S. D.			
Total Reputation	Boys	82	63.5	30.6	93	68.1	28.7	4.6	4.50	1.0
	Girls	85	76.8	26.2	69	83.1	23.3	6.3	3.99	1.6
Coöperation Criterion	Boys	91	—0.3	12.1	101	4.6	10.3	4.9	1.63	3.0
	Girls	95	3.3	11.6	82	7.7	7.6	4.4	1.46	3.0

B. Records of Behavior

Tests of Helpfulness

Four tests of helpfulness, in addition to the Efficiency tests, were given in our population, the Free Choice and three tests of the Character Education Inquiry. These tests were described briefly in Chapter V. Table 83 presents the means of the two groups on the Free Choice test.

TABLE 83

Comparison Between the Competitive and Coöperative Groups in Average Scores on the Free Choice Test

School	Competitive			Coöperative			Diff.	σ Diff.	D/σD	Per Cent Overlap
	N	Mean	S.D.	N	Mean	S.D.				
L	96	2.2	1.7	67	3.4	2.0	1.2	.3	4.0	77.6
E	52	1.7	1.3	53	2.4	1.9	.7	.32	2.2	58.9
W	56	1.8	1.3	82	3.0	2.3	1.2	.31	3.9	64.9
Total ...	204	2.0	1.5	202	3.0	2.1	1.0	.18	5.6	66.7

There was not a single child of the competitive group who gave all the work units to the group. There were fourteen children in the coöperative group who gave all to the group. This holds true for each of the schools. In school W there was not a single child in the competitive group who gave more than half to his group. Their distribution ends abruptly at the score of four. The distribution of the coöperative group continues normally to the maximum score of seven. Twenty per cent of the coöperative group exceed the very highest score of the competitive group. In school L there were more than twice as many of the competitive group who gave nothing to the group (32 per cent) than of the coöperative group (15 per cent). It is noteworthy that a larger percentage of the competitive group voted that the prize be given to the child making the highest score (competitive 14 per cent, coöperative 8 per cent). A smaller percentage of the competitive group voted that the money be spent on charity (27 and 36 per cent, respectively).

The Envelope Test. Of those who failed to participate in this test of helpfulness there were many more in the competitive (70 per cent) than in the coöperative group (30 per cent). Of those who showed helpfulness on this test there were more in the coöperative (62 per cent) than in the competitive group (38 per cent).

The Vote Test. The coöperative group was slightly superior on this test of charitableness. The difference in favor of the cooperative group was 1.7 its S.D.

Tests of Persistence

Three scores of persistence were used in this comparison:

1. The persistence in work for self.—This score is described in Chapter IV.

2. Sub-total of persistence.—A total of three Character Education Inquiry tests attempting to measure the length of time a child would persist on a difficult task before giving it up.

3. Total persistence.—A composite of the above-mentioned three tests plus the persistence scores in work for self and in work for the group.

Table 84 presents the means and the differences.

The coöperative group scored higher on the Total Persistence score and on Persistence of Work. On the Character Education

TABLE 84

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN SCORES ON TESTS OF PERSISTENCE

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S.D.				
Persistence in Work..	189	2.3	41.1	192	8.5	27.4	6.2	3.58	1.7	60.0
Persistence in Puzzles.	172	59.0	31.5	178	51.5	30.1	—7.5	3.29	—2.3	45.6
Persistence Total	156	152.6	95.6	163	169.4	95.2	16.8	10.7	1.6	66.8

Inquiry persistence tests, however, the competitive group scored higher than the coöperative group.

Tests of Inhibition

The scores on two inhibition tests and the total inhibition score of the Character Education Inquiry were used.

1. Speed Inhibition test. It measured the degree to which a child inhibited the desire to look at pictures and jokes dispersed throughout pages of arithmetic work.

2. Puzzle Peg test.

3. The Total Inhibition score is the composite of three inhibitions tests (without the Speed Inhibition).

The means and differences are presented in Table 85.

TABLE 85

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN SCORES ON TESTS OF INHIBITION

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S.D.				
Inhibition Distraction	190	18.1	2.8	190	17.7	2.9	—.4	.29	—1.4	45.1
Inhibition in Puzzles	49	95.6	18.5	74	102.3	15.9	6.7	3.22	2.1	63.1
Inhibition Total	158	11.4	3.8	160	12.2	3.8	.8	.43	1.9	57.8

The competitive group seems to be slightly *more* inhibitive on the Distraction test. The children of the competitive group

were less distracted and were more successful in sticking to their work. In the other inhibition tests the coöperative group seems to be somewhat superior.

Tests of Honesty

The Character Education Inquiry has administered a large battery of honesty tests to this population. The following six sets of scores were selected for our comparison:

1. Total honesty score in tests involving work at school.
2. Total honesty score involving work at home.
3. Total honesty score of behavior at parties.
4. Total honesty score of tests involving out-of-class activities.
5. An honesty test involving speed of work.
6. Composite honesty score, total of all honesty tests.

Table 86 presents the deception scores of the coöperative and competitive groups on each of the six scores.

TABLE 86

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN SCORES ON TESTS OF HONESTY

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S. D.	N	Mean	S. D.				
Honesty in School Work	150	—12.9	8.5	150	—9.9	7.7	3.0	.94	3.2	63.5
Honesty in Home Work	145	—1.8	2.0	142	—1.4	2.0	.4	.24	1.7	52.2
Honesty Out of Class ..	178	—2.4	3.8	178	—1.7	3.4	.7	.38	1.8	56.1
Honesty in Speed Contest	192	—.8	2.2	187	.0	1.8	.8	.21	3.8	63.2
Honesty at a Party	38	—3.9	4.4	69	—5.4	5.2	—1.5	.95	—1.6	37.6
Honesty Total	119	—20.7	12.6	131	—17.0	11.6	3.7	1.52	2.4	59.2

The coöperative group scored higher on the honesty tests. Considering the total population, the superiority of the coöperative group held true for five of the six honesty scores.

On one of the honesty tests, however, the score of the coöperative group was even lower than that of the competitive group.

On the party tests they were less honest. It is possible that in those tests involving social situations as in the case of parties or open contests, the coöperative group, probably higher in sociability, is motivated to a greater extent, and is thus comparatively less honest than on the other tests.

Similarly, the higher deception score on the side of the competitive group is probably due to their greater ambition and eagerness to succeed rather than to lower standards (see Chapter Four; also *Studies in Deceit,* Book I, page 397, on Motivation and Deception). In fact, the only honesty tests in which the competitive group is *significantly* inferior are those involving school work (the speed test and the school total). These tasks are very similar in nature to those of the Efficiency test, in which the competitive group has demonstrated its greater ambitiousness.

Summary of Objective Records

The coöperative groups scored higher on each one of the objective records of helpfulness and coöperativeness. It was affected to a lesser degree by fatigue and continued work, but it was less persistent than the competitive group in tests involving reading puzzles and problems. It exhibited greater inhibition on tests involving puzzles and playthings but the children of this group were less able to resist the distraction of interesting pictures and jokes dispersed throughout arithmetic work. The competitive group was more *deceptive* in tests of honesty.

C. Records of Age, Intelligence, and Scholastic Status

Comparisons were made between the competitive and coöperative groups on the following scores (C.E.I. records).

1. Chronological age.
2. Intelligence.
3. Mental Age (I.E.R. test, point score).
4. Average of teachers' marks in English, arithmetic, etc.
5. Speed of work in additions.
6. Speed of learning a series of digit symbols (devised by Dr. H. Li).
7. Average mark of deportment in school.
8. Length of stay in school from entrance to time of testing.

Comparisons are given in Tables 87 and 88.

TABLE 87

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN AGE AND INTELLIGENCE

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S.D.				
Chronological Age ..	199	10.1	3.3	196	9.3	2.8	— .8	.31	—2.6	42.3
Mental Age	187	91.5	21.8	185	95.0	24.4	3.5	2.40	1.5	58.1
Intelligence	136	46.4	8.6	181	48.3	9.3	1.9	.93	2.0	58.8

Chronological Age

The children of the competitive group are definitely *older* than those of the coöperative group. The chances are 99.5 in 100 that the difference in age is a true difference in age between the two groups. The difference was consistent. In each of our three populations the competitive group was of higher chronological age. The older children, then, tended to work at a higher efficiency when they worked for themselves (competition) than when they worked for their group (coöperation).

Mental Age

The children of the competitive group had a lower average of mental age than those of the coöperative group. The chances are 93 in 100 that it is a true difference. This difference was also consistent. In each of the three schools the children of the coöperative group had a somewhat lower chronological age and a similarly higher mental age. (An attempt to explain this relationship between C.A., M.A., and coöperation will be found in Chapter XIII, Interpretations and Conclusions.)

Intelligence

Table 87 shows that the coöperative group is of higher intelligence. The chances of a true difference are 98 in 100.

Years in School

The children of the coöperative group were on an average more years in the school where they were tested than the children of the competitive group. The chances are 96 in 100 that it is a true difference.

This, however, does not hold true for all our schools. In

TABLE 88

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN SCHOOL STATUS AND ACHIEVEMENT

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVER-LAP
	N	Mean	S.D.	N	Mean	S.D.				
Years in School ..	186	4.8	2.8	196	5.3	2.7	.5	.28	1.8	54.2
Teachers' Marks ..	148	80.0	9.8	189	79.6	9.1	—.4	1.04	—.4	49.2
Deportment in School.	194	1.3	.8	184	1.4	.9	.1	.09	1.1	57.2
Speed in Learning.	48	34.3	6.4	66	33.3	6.0	—1.0	1.18	—0.8	45.0
Speed in Arithmetic	152	54.7	16.1	165	47.2	16.6	—7.5	1.54	—4.9	37.2

school L (poorest) the coöperative group stayed *less* in school than the competitive group. The relation between length of stay in school and coöperation seems to depend upon the nature of the school. In school L, where coöperation was lowest, those who were most coöperative were those who stayed *least* in that school, and vice versa, for the other schools.

Teachers' Marks

The children of the competitive group had a slightly higher average on teachers' marks in English, arithmetic, etc. The attainment of rank in class and teachers' marks often depend directly upon competitiveness. They were lower, however, in teachers' marks on deportment. This probably depends more upon the teachers' general impression or upon the adjustment of the individual child within the group. The competitive group has probably more discipline problems, etc., and thus scored *lower* in deportment.

Speed in Learning

The competitive group was superior in this test involving motivated speed of learning a series of digit symbols. As prizes were promised to those scoring high it is no wonder that the children of the competitive group learned faster and made higher scores.

Speed in Arithmetic

In speed of work on simple additions, the competitive group displayed an overwhelming superiority. The difference was consistent in each of the schools and statistically significant. Only 37 per cent of the coöperative group reached the median of the competitive group in this measure of speed.

Speed is correlated with chronological age (+ .35). As the competitive group was on an average *older* than the coöperative group the difference in speed may, to some extent, be due to the difference in age. It will be noted that the difference in favor of the competitive group in speed is much larger than the difference in age. The former could not be the only cause of the latter difference even if the correlation between age and speed were higher than what was actually found. The greater ambitiousness of the competitive group is probably an additional cause of its superiority in speed of work.

D. Measures of Physical Strength, Health, and Emotionality

The nature of these scores was described in Chapter VIII. The competitive and coöperative groups will be compared on the basis of their respective means in the following measures:

1. Physical ability (Smedley hand dynamometer, jumping, chinning, etc.).
2. Physical conditions. The physical ability score for given age and weight.
3. Cleanliness (score = amount of old dirt).
4. Condition of teeth (score = lack of correction).
5. Condition of eyes (low score = poor vision).
6. Nutrition (score = amount of superfluous tissue, etc.).
7. Total health. The composite of the last three (low score = good condition).
8. Health history, number of diseases, etc. (low score = good condition).
9. Woodworth-Mathews Questionnaire: emotional instability.
10. Suggestibility: *resistance* to suggestion.

In physical condition, the competitive group displayed greater physical strength in each of the schools. This, however, is

TABLE 89

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN PHYSICAL STRENGTH AND EMOTIONALITY

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S.D.				
Physical Ability ..	189	112.2	21.7	172	108.8	21.8	—3.4	2.29	—1.5	46.0
Physical Conditions	195	101.7	17.6	186	102.5	18.1	.8	1.83	0.4	54.2
Neurotic Index ...	183	18.9	11.2	180	19.4	10.8	.5	1.15	0.4	55.1
Non-Suggestibility ..	175	50.0	15.3	175	49.9	19.2	—.1	1.83	—.1	48.3

probably due to their higher chronological age. In physical ability (for given age and weight) there is little difference between the groups. The competitive group is superior on the various health scores, on total health and health history scores. The comparison of the means of the two groups are shown in Tables 89 and 90.

The coöperative group is definitely inferior in the total health score and in the health history. The differences approach statistical significance. More than 71 per cent of the coöperative group reach the median of the competitive group on the total health defects. The coöperative group also appears inferior in condition of teeth and nutrition.

TABLE 90

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS IN HEALTH SCORES

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S.D.				
Cleanliness .	35	1.7	1.0	45	1.9	1.1	0.2	.22	1.0	64.4
Teeth	37	1.0	.5	48	1.1	.6	0.1	.30	.33	54.2
Eyes	43	1.4	.5	59	1.4	.3	.0	...	...	49.2
Nutrition ..	36	1.3	.3	42	1.6	.4	0.3	.20	1.5	66.7
Total Health ..	33	—5.3	16.8	40	+4.8	15.2	10.1	3.79	2.7	71.9
Health History	52	1.7	0.4	75	2.0	1.1	0.3	0.14	2.1	58.8

The coöperative group displays a greater variability than the other group on the health history score. The extremely healthy and the extremely unhealthy were in this group. The difference in S.D. is .7 and 5.0 times its own S.D.

On the Woodworth-Matthews Questionnaire the two groups display the same tendency as on the preceding health scores. In each one of the schools the coöperative group scored higher on this test of neurotic tendencies (greater instability). Though these differences are small they are consistently in one direction.

In non-suggestibility the coöperative group scored somewhat lower in school E. In the other two schools, this group scored somewhat higher. In the total population the competitive group has a slightly higher mean.

E. Moral Knowledge and Social Intelligence

TABLE 91

Comparison Between the Competitive and Coöperative Groups in Scores on Tests of Moral Knowledge

	Competitive			Coöperative			Diff.	σ Diff.	D/σD	Per Cent Overlap
	N	Mean	S.D.	N	Mean	S.D.				
Good Citizenship ..	185	52.6	14.4	190	54.0	14.6	1.4	1.5	.9	55.8
Information of Standards	148	338.2	66.1	156	343.9	62.4	5.7	7.38	.8	53.7
Moral Opinion	171	437.6	79.7	171	441.0	63.9	3.4	7.81	.4	52.0
Moral Attitudes	155	461.8	129.6	152	483.6	127.3	21.8	14.66	1.5	61.2

The coöperative group scored higher on each one of the tests of moral knowledge. There was, however, considerable population difference in this respect. In school E, for instance, the competitive group was higher on each one of the moral knowledge tests.

It should be noted that the children of school E were definitely above the average of our total population in both intelligence and moral knowledge but below the average in coöperativeness.

As in the relation to intelligence coöperation increases with moral knowledge only to a certain degree of the latter. Increase

above the average in knowledge is not accompanied by increase in coöperation.

F. Attitude Toward Work

The Character Education Inquiry devised a number of rating scales by which a child is scored on his attitude toward work.

1. Home functioning.—The parents rated their children on willingness to work.
2. School functioning.—Similar to the preceding scale but filled out by the classroom teacher.
3. Club functioning.—The club leader rates the child on his willingness to participate in group activities.
4. Self functioning.—The child rates himself on willingness to work for himself (in a sense, this is a measure of ambitiousness).

A comparison of the competitive and the coöperative groups on each of these functioning scales is presented in Table 92.

TABLE 92

Comparison Between the Competitive and Coöperative Groups in Attitude Toward Work

	Competitive			Coöperative			Diff.	σ Diff.	D/σD	Per Cent Overlap
	N	Mean	S.D.	N	Mean	S.D.				
Home Activities ..	21	5.7	2.7	29	5.1	2.8	—.6	.79	—.76	34.3
Club Activities	9	5.5	1.8	9	6.5	2.3	1.0	.97	1.0	75.0
School Activities ..	151	5.3	1.9	168	5.1	5.1	—.2	.22	—.9	49.6
Work for Self	137	38.7	7.7	147	37.8	7.2	—.9	.89	—1.0	36.4

According to the testimony of the parents the children of the competitive group were slightly more willing to work at home than the children of the coöperative group. As there may have been a bias on the side of some parents to give their children a favorable score this comparison is probably unreliable.

A similar rating by club-leaders as to the willingness of the child to participate in club activities revealed an opposite tendency. The children of the coöperative group were rated

higher than those of the competitive group. Only 25 per cent of the latter reached or exceeded the median of the former.

As far as work in school is concerned, there seems to be little difference between the groups. Their medians are nearly identical. The mean of the competitive group, however, is slightly higher than that of the coöperative group.

On the basis of the children's self rating concerning their willingness to work for themselves, the competitive group is definitely rated higher. Only 36 per cent of the coöperative children reached the median of the competitive group.

On the whole, the ratings in attitude toward work seem to agree with the results of the scores on the coöperation test. The coöperative children were rated as being more willing to engage in club activities, while the competitive children were rated higher in readiness to work for their home and for themselves.

There is, however, a marked population difference in this connection. In the self rating on work for personal needs the difference in favor of the competitive group was extremely large in school E (well-to-do population). Less than 20 per cent of the coöperative children reached the median of the competitive group. In school W (highest in coöperation), however, the children of the coöperative group rated themselves as slightly higher than those of the competitive group.

G. Extra-Curricular Activities

The competitive and coöperative groups were compared on their score in a number of extra-curricular activities:

1. Membership in clubs, as, for example, Boy Scouts or Girl Scouts.
2. Attendance at Sunday School.
3. The frequency of attendance at moving pictures.
4. Time spent in play.
5. Number of friends.

Club Membership

There was a larger percentage of club members in the coöperative group (56 per cent) than in the competitive group (44 per cent). The Boy Scouts alone were represented in the coöperative group by 73 per cent, 69 per cent, 58 per cent in the three schools L, E, and W, respectively. The club members

seem to fall in the coöperative group more frequently than non-members.

Attendance at Sunday Schools

There were available two scores concerning attendance at Sunday School on the Character Education Inquiry records: the number of years a child went to Sunday School and the frequency of attendance at Sunday School per month.

The average lengths of stay in Sunday School of the competitive and coöperative groups were 3.8 and 4.3 years, respectively. The difference in favor of the coöperative group is 1.4 in terms of its S.D. The means of regularity of attendance at Sunday School (per month) were 3.8 and 3.7 for the competitive and cooperative groups, respectively. The difference in favor of the competitive group is .7 its S.D.

Time Spent on Play

This score was obtained for 108 children who recorded for one week what they did during each hour of the day. The average number of hours per week spent in play by the competitive and coöperative groups was 11.6 and 10.3 respectively.

Only 34 per cent of the coöperative group reached the median of the competitive group. The children of the competitive group spent a greater number of hours on play.

Number of Friends

It was somewhat surprising to find that the children of the coöperative group had a smaller number of friends than the children of the competitive group. The difference in terms of its S.D. was — 1.9. An inspection of the variation of popularity within the two groups revealed that the S.D. of friends was consistently larger in the competitive than in the coöperative group. The difference in S.D. is 2.0 its own standard deviation. The competitive group seems to consist of children who have very many friends and those who have very few friends. (See p. 113.)

Attendance at Moving Pictures

In each one of the three schools the coöperative group has a lower movie score, indicating a lower frequency of attendance than that of the competitive group. In our total population the average weekly attendance at movies was 1.9 for the children

of the coöperative group and 2.3 for those of the competitive group. The difference was significant; in terms of its standard deviation it was 3.1. Only 39 per cent of the coöperative group reached or exceeded the median movie attendance of the competitive group.

There were thirty-four children in the coöperative group and thirty-six in the competitive group who kept a diary for a complete week recording everything they did. (Data gathered by Mr. C. A. Kerr.) These children recorded their attendance at movies. The median weekly attendance at movies recorded by children of the coöperative group was 1.3 and for the competitive group it was 1.8. Less than 38 per cent of the former reached the median of the latter.

Summary of Extra-Curricular Activities

The coöperative groups have a larger percentage of children belonging to such organizations as Boy Scouts, Girl Scouts, etc. They show a slightly higher length of attendance, though not greater frequency of attendance at Sunday School. They have a slightly smaller number of "friends" and attend movies *less* often than the children of the competitive group.

H. Home Background

The following scores were available on the nature of the home, parents, and family (C.E.I. records).

1. Socio-economic status of the parents.
2. Occupation of father.
3. Cultural background (Burdick test).
4. Number of children in the family.
5. Father's intelligence.
6. Mother's intelligence.
7. Average parents' intelligence.
8. Father's moral knowledge.
9. Mother's moral knowledge.
10. Average of parents' moral knowledge.
11. National origin.

Tables 93 and 94 present the scores of the two groups on each of the above scores.

The children of the competitive group come from homes of *higher* socio-economic status, somewhat higher occupational level

TABLE 93

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS ON HOME BACKGROUND

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S.D.	N	Mean	S. D.				
Social Status	99	20.6	7.0	121	18.9	7.3	—1.7	.97	—1.8	42.6
Fathers Occupation .	164	3.8	1.1	170	3.7	1.0	—.1	.11	—.9	48.0
Cultural Level ...	177	157.7	60.0	182	167.4	53.9	9.7	6.02	1.6	62.5
Size of Family ..	164	3.6	1.9	159	3.5	2.0	—0.1	.22	—0.5	48.7

and slightly larger families. The cultural background of their homes, however, is lower.

The parents of the coöperative group are superior in both intelligence and moral knowledge. This superiority holds true for the scores of both father and mother.

There was, however, a difference between the populations in this connection. In school E (superior socially) the parents of the coöperative group were inferior in moral knowledge and intelligence. It will be recalled that the same population differ-

TABLE 94

COMPARISON BETWEEN THE COMPETITIVE AND COÖPERATIVE GROUPS ON INTELLIGENCE AND MORAL KNOWLEDGE OF PARENTS

	COMPETITIVE			COÖPERATIVE			DIFF.	σ DIFF.	D/σD	PER CENT OVERLAP
	N	Mean	S. D.	N	Mean	S. D.				
Parents' Intelligence..	41	72.8	26.3	42	81.3	19.7	8.5	5.05	1.7	67.3
Fathers' Intelligence..	40	74.4	25.6	46	79.3	21.4	4.9	5.13	1.0	58.6
Mothers' Intelligence..	54	76.3	24.5	54	80.1	20.3	3.8	4.33	.9	63.5
Parents' Moral Code	41	145.7	25.7	45	150.8	17.9	5.1	4.82	1.1	63.1
Fathers' Moral Code	40	146.5	25.6	45	152.6	19.2	6.1	4.96	1.2	60.7
Mothers' Moral Code	54	146.3	22.6	54	149.6	16.5	3.3	3.81	.9	59.8

ence was found in the comparison between the coöperative and competitive groups in the average moral knowledge of the children (Table 91). In school E the children of the coöperative group had *lower* moral knowledge and cultural background scores than the children of the competitive group. Their parents were similarly inferior to those of the competitive group.

In schools L and W, however, the parents of the coöperative group were definitely superior to those of the competitive group. In fact, for those two schools the difference between the two groups in moral knowledge and intelligence of parents is larger than the difference in intelligence and moral knowledge of the children themselves.

The intelligence and moral knowledge of the parents (in schools L and W) were more incidental in determining whether a child would be in the coöperative or competitive group than the intelligence and moral knowledge of the children themselves.

The home background of the coöperative group was *superior* in intelligence, moral knowledge, and cultural level, but *inferior* in socio-economic status and occupational level. This reversed relationship is surprising in view of the positive correlation between the intellectual and economic factors in the total population. The difference between the groups in each one of the factors would have been even greater if the other were kept constant.

Population Difference

The parents of the two groups differed from one another in a rather consistent manner. In schools L and W the parents of the coöperative group were consistently superior in both intelligence and moral knowledge. In school E they were slightly inferior. In the latter school, of superior social and economic level, the competitive group seem to come from homes superior to those of the coöperative group.

Nationality

Those children whose parents were born in the United States have a larger percentage in the coöperative group. Those whose parents were foreign born have a smaller percentage in the coöperative group. There is little difference between the foreign group and foreign-and-United States (one parent foreign) groups.

There is, however, a marked difference between the schools in this respect. This is shown in Table 95.

There were also marked differences between the various foreign groups in our population. In school L, for instance, 27 per cent of the Italians, 43 per cent of the Slavic, and 50 per cent of the Irish were in the coöperative group. In school W, *none* of the Italians were in the coöperative group while in school E, 75 per cent of them were in this group.

TABLE 95

NATIONALITY AND COÖPERATIVENESS

SCHOOL	COMPETITIVE						COÖPERATIVE					
	U. S.		U. S. and Foreign		Foreign		U. S.		U. S. and Foreign		Foreign	
	N	Per Cent	*N*	Per Cent	*N*	Per Cent	*N*	Per Cent	*N*	Per Cent	*N*	Per Cent
L	18	50	9	75	56	62	18	50	3	25	34	38
E	31	50	9	64	8	50	31	50	5	36	8	50
W	35	36	7	47	8	67	61	64	8	53	4	33
Total	84	43	25	61	72	61	110	57	16	39	46	39

Summary: Comparison of Home Background

The coöperative group has a larger percentage of children whose parents are native born. There is no difference between the percentages of foreign and foreign-and-native parentage. The competitive group comes from homes of slightly higher social economic status. The cultural background of the children of the coöperative group is higher in schools L and W and lower in school E. The same population difference holds true concerning the intelligence and moral knowledge of the parents. In schools L and W the parents (both father and mother) of the cooperative group are superior on each of the tests. On the contrary, in school E the parents of the competitive group show similar superiority.

In school E the competitive group is superior in most of those measures in which the children of this school were generally superior, such as school status, moral knowledge, and home background. This seems to indicate that coöperativeness probably goes with an *average* status in those measures. In those schools

which scored generally below average in a given measure, the coöperative group was superior, but in the school scoring above average the coöperative group was somewhat inferior.

TABLE 96

VARIABILITY OF THE COMPETITIVE AND COÖPERATIVE GROUPS ON VARIOUS MEASURES

MEASURES	VARIABILITY		MEASURES	VARIABILITY	
	Competitive	Coöperative		Competitive	Coöperative
1. *Reputation*			4. *Age, Intelligence, etc.*		
Classmates' rating	36	33	Age	41	38
Teachers' rating.	32	27	M. A.	39	41
Total rating	38	34	Intelligence	40	30
Honesty rating..	42	34	Attitudes	38	35
Inhibition rating	33	29	Opinion	37	30
Persistence rating	58	55	Information	41	37
Coöperation total rating	36	25	Good citizenship	30	30
2. *Objective Tests*			Total moral knowledge	37	35
Honesty, speed..	18	14	School marks	36	34
Honesty, home..	15	15	Deportment	100	100
Honesty, school.	43	34	5. *Home Environment*		
Inhibition distraction	16	17	Father's intelligence	51	39
Honesty, parties.	36	30	Father's moral knowledge	50	33
Persistence, total	54	49	Mother's intelligence	44	30
Honesty, total..	58	45	Mother's moral knowledge	47	36
Persistence, puzzles	61	68	Socio - economic status	40	46
Inhibition, total.	37	34	Cultural background	52	43
Free choice	100	84	Parents' intelligence	55	24
Vote of help	61	55	Parents' moral knowledge	51	32
Persistence, speed	45	28	Father's occupation	48	45
3. *Miscellaneous*			Years in school..	65	56
Years in Sunday School	79	66	Friends	68	67
Movies	72	86			
Suggestibility ..	38	48			
Woodworth Mathews	68	64			
Speed of work...	41	52			

Variability within the Groups

It should be noted that the competitive group displays greater variability than the coöperative group. On each of the ratings the competitive group has a higher standard deviation. In view of the fact that their mean is consistently lower, their coefficient of variation (V = S.D./M) is particularly greater. The parents of the competitive group also display greater variation in each of their scores. This is shown in Table 96.

They show greater variability in age, neurotic index, and on most of the objective tests of persistence, honesty, and moral knowledge. These children vary more in frequency of movies, number of friends, occupation, cultural background and length of stay in school. The coöperative group shows less variation in the above measures. Even in such measures as intelligence where their S.D. is larger, it is only because their mean is also larger. Their ratio S.D./Mean is smaller than that of the competitive group. (These ratios are in terms of step intervals.)

The consistently lesser variability within the coöperative group indicates that its members cluster around the average to a greater degree than do the members of the competitive group. Homogeneity within a group is probably an important factor in coöperativeness. Those who are above the average as well as those below it are more predominent in the competitive group.

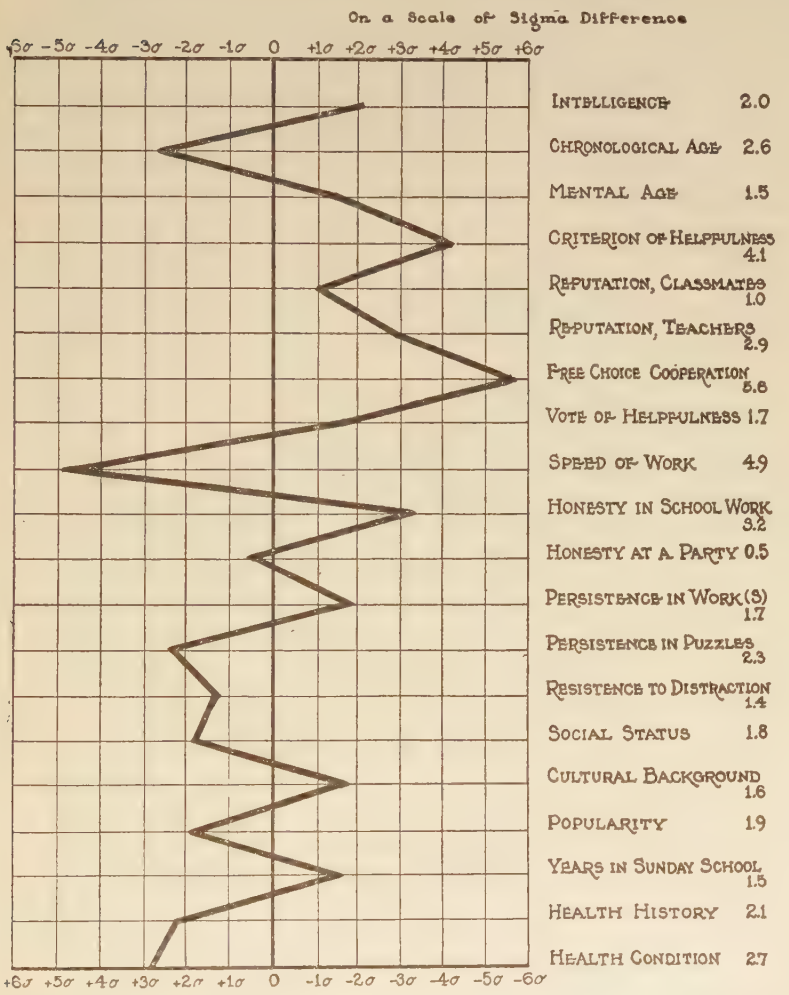
Summary: Detailed Study of Coöperative and Competitive Groups

The children of the upper and the lower quartiles of the Efficiency Coöperation test appear to differ considerably from one another on many of the tests and measures that were available. They seem to form two groups with more or less distinctive characteristics; a coöperative-rather-than-competitive group, and a competitive-rather-than-coöperative group.

The coöperative group scored higher on all tests involving *socialized behavior*. Their superiority was most marked in other tests of helpfulness and in ratings on helpfulness by teachers and classmates. They were quite superior in tests of honesty and in ratings on honesty. Both coöperation and honesty involve self-others relationship. They were more engaged in club activities and attended movies less frequently.

FIGURE VI

PROFILE OF THE COÖPERATIVE AND COMPETITIVE GROUPS


On a Scale of Sigma Difference
+6σ +5σ +4σ +3σ +2σ +1σ 0 -1σ -2σ -3σ -4σ -5σ -6σ
INTELLIGENCE 2.0
CHRONOLOGICAL AGE 2.6
MENTAL AGE 1.5
CRITERION OF HELPFULNESS 4.1
REPUTATION, CLASSMATES 1.0
REPUTATION, TEACHERS 2.9
FREE CHOICE COÖPERATION 5.6
VOTE OF HELPFULNESS 1.7
SPEED OF WORK 4.9
HONESTY IN SCHOOL WORK 3.2
HONESTY AT A PARTY 0.5
PERSISTENCE IN WORK (S) 1.7
PERSISTENCE IN PUZZLES 2.3
RESISTENCE TO DISTRACTION 1.4
SOCIAL STATUS 1.8
CULTURAL BACKGROUND 1.6
POPULARITY 1.9
YEARS IN SUNDAY SCHOOL 1.5
HEALTH HISTORY 2.1
HEALTH CONDITION 2.7

They were definitely more homogeneous on most of the measures available.

The competitive group displayed greater *ambitiousness*. They worked at a higher speed on all speed tests and they were more deceptive on the honesty tests. They showed greater persistence on some tests and were rated as equal in persistence to the other

group. They came from somewhat wealthier homes and were of better health conditions. They displayed greater variability on all the criterion scores and on most of the other measures.

The competitive group was most probably lower in perseveration. They displayed greater ability of adjusting their speed on different levels. It is quite possible that this difference is responsible for many of the other differences between the two groups. But the isolation of a score in individual difference in inertia would require further research.

Profiles of the Two Groups

Figure VI presents a summary of the differences between the coöperative and competitive groups in the form of a profile.

The unit of comparison is uniformly the S.D. of the difference. The scale is divided into twelve sigma units. The profile of the coöperative group reads as follows: Higher in helpfulness criterion and difference is 4.1 times its S.D.; lower age and difference is 2.6 its S.D., etc. Similarly, the profile of the competitive group reads: Inferior in helpfulness criterion and difference is 4.1 its S.D., etc.

The profile of the coöperative group is obtained by following the scale at the top of page which runs from — 6 S.D. to + 6 S.D. Similarly, the profile of the competitive group is obtained by following the scale at the bottom of page which runs inversely from + 6 S.D. to — 6 S.D.

CHAPTER XII

SPECIAL PROBLEMS IN MOTIVATION

A. Personal and Social Motivations without Alternation

The two forms of motivation used in our major experiment were given in alternating form (see Chapter II).

The specific problem of this phase of the experiment was the relative intensity of the motivations of self and group when given independently.

Population

Six groups (B-I′ to B-N′) were used for this investigation. The material used was similar to that of our major experiment except that instead of simple additions the work included subtraction and multiplication.

Procedure

Five of the groups were tested four times each on four different days in the following order:

1. *Unmotivated.* The experimenter gave no explanations. He simply distributed the tests and said, "I want you to do some arithmetic for me." The task was then explained and the children went on working without any apparent motivation. They were to stop at the end of each half minute and draw a circle around the example that they were doing and then continue. We thus had a measure of speed during each half minute. The work continued for 24 minutes.

2. *Self-Motivation.* This test was given three days after the unmotivated work. After distributing the tests, the examiner said, "I have looked over your papers. Some of them were very good, others were not quite so good. *All* of them might be better. Now we are going to have a contest—a self-improvement contest. I shall give a prize to those who make the most improvement over their own former scores. Remember each one of you has an equal chance to win because this is a self-

improvement contest." Again the children were to draw a circle after each half minute and the work continued for 24 minutes.

3. *Group Motivation.* This experimental period took place on the day following the *self-motivation.* They were given 48 units of work, one half minute each. The directions were, "Now we are going to have a different kind of contest. We are going to have an interclass contest, a contest between the five 6B classes that are taking this test. I am going to give a class prize to that class which makes the most improvement over its own very first score. Be sure to put the number of your class at the top of the page. Do *not* write your name. Remember you are working only for your class, not for yourself. Each class has an equal chance of winning because this is a class improvement contest."

4. *Final Unmotivated Work.* On the last day of the experiment, the examiner distributed the tests and said, "I want you to do some arithmetic for me just for practice. I am not going to give any prize or tell anyone of your work to-day." The procedure of work was the same as on previous days.

The Control Group. One of the groups was used as a control group in order to determine the effect of practice. This group was also tested four times and all conditions were kept identical with those of the experimental groups with the exception that no motivation was given on any of the four testing periods.

Table 97 shows the average speed of each of the four periods of testing for the experimental group and for the control group.

TABLE 97

SPEED OF WORK ON FOUR TESTING PERIODS FOR EXPERIMENTAL GROUPS AND FOR THEIR CORRESPONDING CONTROLS

MOTIVE	EXPERIMENTAL M	CONTROL M	E/C	E×C/U
Unmotivated (*i*)	14.8	16.4	.90	
Self	18.2	19.4	.94	104
Group	18.6	22.2	.84	96
Unmotivated (*f*)	19.2	23.6	.81	

Column 1 gives the nature of the motive; column 2 gives the speed of work of the five experimental groups; column 3 gives the speed of the respective testing periods of the control group;

column 4 gives the ratio of the experimental to its corresponding control and the last column gives the ratio of the motivated to the initial unmotivated in terms of the control.[1]

Table 97 indicates the following:

1. The speed of self work as well as that of group work was greater than that of unmotivated work.

2. The increase in speed, however, is mostly due to practice, as seen from the similar increase in the control group.

3. Self motivations caused an increase of 3.4 examples per minute. The corresponding increase in the control group was 3.0. The increase due to the self motive was 113 per cent as potent as mere practice.

Group motivation (without name on group work) caused a very small increase in speed. The actual speed increased to the extent of .4 examples per minute. But the corresponding control group showed an increase from the second to the third day of 2.9 due to practice. The increase due to the group motive was only 14 per cent of the increase due to mere practice. The motive then caused a relative decrease.

The decrease is probably due to the fact that on the group work the children were not to sign their names. Work was simply done for an inter-group contest, and the motive was to help the *group* win the prize. Furthermore, group work followed self work, which was evidently a transition from a stronger to a weaker motive. This was not the case in the two periods of practice work in the control groups.

The Work Curve

Table 98 presents the data for the work curve under no motivation and under personal and group motivation.

Part A gives the number of examples done per minute under personal motivation and group motivation, and also for the corresponding controls (of second and third testing). In part B each mean is divided by the corresponding mean of unmotivated work (first day testing). This eliminates the initial differences in speed between the control and the experimental groups. In part C the speed under motivation is also divided by their corresponding controls. This eliminates the different degrees of practice effect.

[1] The data for Tables 97 and 98 were gathered by Miss H. Jungman.

TABLE 98

THE WORK CURVE UNDER VARIOUS FORMS OF MOTIVATION

A. THE ACTUAL SPEED DURING EIGHT PERIODS OF CONTINUOUS WORK

MOTIVE	UNIT							
	1	2	3	4	5	6	7	8
Self	23.6	17.8	17.6	17.6	16.0	16.0	18.2	17.6
Group	23.4	18.4	18.0	17.8	17.6	18.2	17.8	18.2
Control S..	24.2	20.2	19.8	18.0	19.0	19.8	19.4	19.6
Control G..	26.0	24.2	22.0	22.6	21.4	22.4	20.6	19.8

B. THE RATIOS OF SPEED UNDER MOTIVATION TO THE CORRESPONDING MEANS OF UNMOTIVATED WORK

MOTIVE	UNIT							
	1	2	3	4	5	6	7	8
Self	161	123	121	120	120	180	124	121
Group	159	125	122	121	120	123	120	123
Control S..	148	123	121	109	116	121	118	114
Control G..	158	148	134	138	130	136	126	116

C. THE RATIOS OF SPEED UNDER MOTIVATION TO THEIR CORRESPONDING CONTROLS

MOTIVE	UNIT							
	1	2	3	4	5	6	7	8
Self	114	100	100	110	103	91	105	106
Group	100	84	91	88	92	90	95	106

Table 98 shows that the curves of work under personal and group motivation differ mostly during the first units of testing and that these differences decrease markedly with the progress of the work.

B. DOUBLE MOTIVATION

This test was given after the Efficiency and Free Choice tests, after a period of thirty-two minutes of continuous work supposedly at top speed. The children were told that they were going to do the last 2 minutes of work and that this last test unit would count for their own score as well as for the score of their classroom. They were then urged to work as fast as possible.

The purpose of this test was to find whether added motivation would raise the speed.

Table 99 presents the mean speed under double motivation. Column DM gives the mean speed under double motivation, columns S and G give the speed of self and group work, columns s and g give the increase in speed of DM above that of self and group work, respectively.

TABLE 99

SPEED OF WORK UNDER DOUBLE MOTIVATION

SCHOOL	DM	S	G	s	g
L	58.3	50.1	45.6	8.2	2.7
E	47.9	43.0	40.4	4.9	7.5
W	49.8	45.9	44.9	3.9	4.9
Total	52.2	46.3	43.6	5.9	8.6

Table 99 shows that the speed was consistently raised under the added motivation. This happened in spite of the complaint of the children that they were tired and that the examiner should "have a heart" and give them a little rest. Furthermore, it will be remembered that during the thirty-two minutes of work the children were supposedly working at their top speed. The consistent increase shows that none of the groups worked really at their highest speed even when they worked for themselves. It is possible that the increased speed was the result of practice effect. The latter was probably "covered up" by fatigue. The added motivation succeeded in removing at least temporarily the effect of fatigue, and the added skill resulted in higher speed.

C. EFFECT OF INSTRUCTION UPON COÖPERATIVENESS

To what extent can the response to a social motive be affected by a series of lessons attempting to teach ideas of cooperation and of helpfulness? Can this effect be detected by the present test of comparing work under the self-others motivations?

In view of the significance of the problem it was felt that groups should be chosen which were most nearly identical. Two classes in a junior high school (T7B and T7D) and two classes of Grade VI (S6A and S6B) in a grammar school—150 cases in all—were chosen. Groups 7B and 6A were used as controls; 7D and 6B were used as the experimental groups.

The initial test of Efficiency and Free Choice was given to four classes under identical conditions. After the initial test one of the classes in each school was given a series of three lessons in coöperation. The outline of these lessons follows:

I. Three stories were read without noting the "moral" involved. The first story carries the idea of all persons sharing equally, and mutually benefiting thereby. The second indicates that while different persons may have different abilities, yet they may be mutually helpful by complementing one another's work. The third suggests that not doing one's full share is contemptible.

II. A practical demonstration before the class, of the strength of a strand of rope versus the weakness of any single thread. This followed by having the teacher write on the board, "A chain is not stronger than its weakest link," and by having each child write in his notebook, for completion, the parts of sentences. "A team is not stronger than ....," and "A class is not stronger than....," with the request that they study these statements and complete them for the next day's lesson.

III. A discussion based on the completed sentences, in which the children voluntarily drew on the stories previously told to enforce their arguments. On the following simple blackboard scale:

Self Only *50-50* *Others Only*

the children indicated where the ideal pupil should be on such a scale. The majority of 7A agreed that he should be towards the "Others" end, while the class of 6B decided that he should be just at the center.

The final test was given independent of the lessons to all classes, to determine differences created by the teaching. Comparisons are indicated in Table 100. This table shows that each one of the experimental groups gained in coöperativeness in the final testing on both tests. The control groups did less on the final than on the initial tests. The latter difference is insignificant. Instruction succeeded in bringing about at least a temporary increase in coöperativeness. It will be noted that the increase on the Free Choice test was uniformly greater. The latter test

TABLE 100

EFFECT OF INSTRUCTION

A. EFFICIENCY COÖPERATION

GRADE	INITIAL	FINAL	DIFF.	D/σD
Experimental Groups				
7-D	97.5	99.9	2.4	2.9
6-A	97.1	98.8	1.7	2.7
Control Groups				
7-B	96.9	95.7	—1.2	0.8
6-B	97.6	97.0	—0.6	0.3

B. FREE CHOICE COÖPERATION

GRADE	INITIAL	FINAL	DIFF.	D/σD
Experimental Groups				
7-C	2.0	4.5	2.5	4.3
6-A	2.2	3.8	1.6	2.5
Control Groups				
7-B	4.0	3.4	—0.6	1.1
6-B	3.6	3.3	—0.3	0.6

involves decision, which is probably more subject to modification than subtle differences in speed.

D. VARIATION IN THE NATURE OF THE GROUP

Throughout this research the "group" with which the children were to coöperate was the class. The pupils in five classrooms were retested to determine with the similar technique the degree of coöperation with the following social groups: (1) team; (2) partnership; (3) sex group (boys vs. girls); (4) arbitrary group; and (5) a control retest.

1. *Team Work.* The children elected two captains. They, in turn, chose two teams which competed with one another in speed. Enthusiasm and loyalty were then worked up to a high pitch (LG).

2. *Partnership.* Each pupil of the class was told to choose a partner. A contest between partnerships was then staged. Each one was supposed to work for the partner, and write the partner's name on his paper (Groups LF and EG).

3. *Boys vs. Girls.* The competing groups consisted of the boys in one group and the girls in the other group (Group WV).

4. *Arbitrary Groups.* The examiner divided the class into two halves. The two groups were then to compete with one another (Group LC).

5. *Control Retest.* In the control group the test was repeated in identical order as on the first day, where the contest was between two classrooms (Group LA).

The mean coöperation with each of those groups was then found. This mean will be compared with the mean coöperation with the classroom.

Table 101 gives for each of these groups the mean and S.D. of coöperation (Free Choice) with the classroom (Basic test) and the mean and S.D. of coöperation on the second day when the nature of the groups varied.

TABLE 101

COÖPERATION WITH THE CLASSROOM AND COÖPERATION WITH OTHER SOCIAL GROUPS

GROUP	RETEST		BASIC TEST				
	Mean	S.D.	Mean	S.D.	Diff.	cD	D/cD
Teamwork	3.05	2.16	1.68	1.92	1.37	.41	3.34
Partnerships ...	2.81	1.67	1.75	1.67	1.06	.26	4.08
Boys vs. Girls..	4.88	1.80	2.92	2.02	1.96	.37	5.30
Arbit. Group ..	2.34	2.04	2.86	2.07	— .59	.32	— 1.84
Repetition	0.52	0.49	1.67	1.96	— 1.15	.40	— 2.9

Table 101 indicates the following:

1. The motive of working for an organized team evoked greater coöperation than that of working for one's classroom. The difference between the two means on the Free Choice test is significant. It should be noted that on the Efficiency test the speed of work for the team was even higher than the speed of work for self during the later *units* of work. As the work progressed, the efficiency of teamwork increased above that of work for self.

2. The motive of working for partnership evoked greater cooperativeness than that of working for the classroom, and the difference is even larger than in the case of teamwork.

3. The motive of working for one's sex group in a contest between boys and girls resulted in a higher coöperation score than any of the other social motives. The average number of units chosen to work for the sex group was even larger than the number chosen to work for self. Of the total number of units (7) seventy per cent were done for the sex group and only thirty per cent for self. It should be noted that the boys displayed a greater degree of self-sacrifice for their group than did the girls.[2]

4. The motive of working for an arbitrary group chosen by the examiner resulted in a *lower* coöperation than when working for the classroom.

5. The repetition of the motive of working for the classroom resulted in lower coöperation than in the original testing. This retested group served as a control. The increase in coöperation in those retests (1-3) in which the motives were team, partnership, and sex group is thus even greater than actually found.

Hierarchy of Motivations

On the basis of the means on the Free Choice test the above forms of motivation can be arranged in the order of their intensities:

1. Sex groups.
2. Self.
3. Team.
4. Partnership.
5. Classroom.
6. Arbitrary group.
7. Repetition of classroom motive.

The hierarchy reads as follows: If the choice is given to work either for a contest between boys and girls or for a personal prize, a greater number of units will be worked for the former than for the latter cause. The goal of team or partnership was found less attractive than that of a personal prize, but more attractive than that of working for one's classroom, etc.

[2] The mean of the boys was 3.3 and the mean of the girls was 2.7. This difference was 2.1, its S.D. The boys scored higher than the girls in coöperation with a team (or with a partner). The girls scored higher in coöperation with their classroom on the Free Choice test.

CHAPTER XIII

INTERPRETATION AND CONCLUSION

It was shown in Chapter III that under alternating personal and social motivation the difference in speed constantly *increases* with progress of work. It was also shown (Chapter XII) that when the two motives are given independently on two different occasions and their respective curves of work are compared the difference in speed is greatest at the beginning and constantly *decreases* with the progress of work. The following generalization seems justified: When two motives are presented in alternation, the respective efficiencies they produce tend to *diverge* with progress of work. When two motives are presented independently, their efficiencies tend to *converge* with progress of work.

The motive of working for a spontaneously organized team was shown to call forth greater efficiency than the motive of working for self, and the difference in speed in favor of teamwork *increased* with the progress of work (Chapter XII). We thus have a sort of hierarchy of motives T, S, and G (team, self, and classroom group). When motive S is alternated with motive G, the former increases. When alternated with motive T, it decreases. The following generalization seems to hold true:

When two motives are presented alternately the efficiencies produced will diverge. The relatively stronger of the two will constantly increase and the weaker will decrease in efficiency.

Difference in Efficiency in Terms of Growth

The difference in speed between work for self and for group is 2.7 examples per minute. What is the meaning and value of such a difference, even though we can be absolutely certain that such is the true difference in efficiency under these two forms of motivation, competition and coöperation? Speed in addition increases with age for children of the elementary grades. The correlation between the speed and age of our population is +.35. From the scattergram we found the mean speed for

each year level and the increase in speed from year to year. The average increase per year for years 9 to 17 (785 cases) was *2.1*. Thus the growth in speed per year is an increase of 2.1 examples per minute. The difference between self and group work, of 2.7, can be looked upon as equivalent to a difference caused by growth of *1.3* years.

Variability

That variability increases with continuous work and fatigue has been observed by Yule [164], Weinland [155], and Verwoerd [150]. As work continues two opposing tendencies arise—practice effect and fatigue. One leads to increase and the other to decrease in speed of work. These opposing tendencies, not being perfectly balanced at any given period of work, will give rise now to increase and now to decrease in speed. The result would naturally be an increased variability. Verwoerd [150] has shown that the effect of fatigue may express itself in three ways: a general decrease in efficiency, a decrease *in evenness*, or a restriction of attention. Each of these effects was observed on our data:

1. The general level of speed, when work for self and group are considered, decreased. The slight increase in self work was more than balanced by the larger decrease in group work.
2. The variability increased, resulting in a reduced evenness of speed.
3. There was restriction of attention to the direction of work for self.

Sex Differences

a) The speed of the girls was higher. It could hardly be the result of greater responsiveness to the motives, because their speed of unmotivated work was also higher. Nor could their superiority be explained in terms of age differences. The average age of the girls was slightly below that of the boys. The following considerations are suggested as to the cause of the sex difference in speed.

1. The girls probably take their school work more seriously and do more homework. They have thus more exercise *in such arithmetic* work as that involved in our tests.

Baumgarten [10] in a study of the effect of the motive of

competition found that girls responded less to it than boys. In fact 71 per cent of them decreased and only 14 per cent increased in speed when that motive was introduced. The difference in the functions, however, may have been the cause of the difference in the results. At any rate, it seems to indicate that the greater increase in speed of the girls in our experiment is rather specific and is connected with the nature *of the function* involved in the tests, and not due to greater responsiveness on the side of the girls.

2. The girls are probably better disciplined in classroom situations. They put forth greater effort in performing even the unmotivated work, for which they signed no name, because they were habituated to do the work required of them by the teacher.

3. The earlier maturation of the girls is probably accompanied by greater muscular coördination and development.

4. There may be an actual sex difference in the ability of speed in such tasks as simple additions.

b) Differences in G–S. The great discrepancy between S and G work on the side of the girls may be due to the following:

1. The difference G–S depends probably on an individual's oscillation and inertia. The higher one's inertia, the greater the tendency of the G and S scores to be nearly equal and the G–S to be very little. This would not be the result of lesser selfishness, but of inability to change one's speed. It is possible that the perseveration of the boys is higher, and accounts for the smaller difference. Because of the girls' lesser inertia, the differences G–S are larger. They are more able to change their speed from minute to minute.

2. It is possible that the girls work at a high pressure of speed under the motive of self and thus do not necessarily respond less to the motive of group; however, they find it more difficult to keep up their maximum effort, or higher M. The boys, not working at top speed even when working for self (lower M), can more easily keep their group work up at that level, but their absolute effort for class is not more than that of the girls.

3. It is also probable, however, that girls are really less cooperative in the type of work involved in the Efficiency test. The idea of helping her group in an inter-group contest may not

appeal to a girl as much as it appeals to a boy. She starts out to work for her group at her highest efficiency but lacks the fighting spirit to maintain her active participation and also the persistency which she displays in her effort to gain recognition for herself.

Sex Differences in the Validity of Our Tests

The girls were rated as definitely superior to the boys on each one of the ratings.[1] On our test they were slightly superior on the Free Choice and inferior on the Efficiency test. On the Character Education Inquiry tests of helpfulness (see Chapter V for description) the girls were somewhat superior to the boys. Their superiority, however, was *less* marked than on the ratings.

Differences Between Groups on Tests and Criteria

The detailed comparison between the competitive and coöperative groups (Chapter XI) revealed that the two groups differed most markedly on the ratings, the coöperative group being rated significantly higher on helpfulness. The difference was less marked in the case of the various objective tests involving helpfulness. We may say that the tests indicate that the coöperative group was *somewhat* superior, while the raters considered it *very* superior in coöperativeness.

Age and Coöperation

The relationship between age and coöperativeness seems to depend upon the nature of the environment. In the most coöperative population the correlation is positive; coöperation increases with age. In the least coöperative population the correlation is negative; coöperation decreases with age. When the total population is considered, the correlation between age and coöperation is extremely low, and slightly negative for the Efficiency test. The difference in speed between work for self and for group was larger for the older children. The tendency of decreased efficiency in group work with the progress of work was particularly marked in the scores of the older children and in the upper grades.

The decrease of coöperation with age is to some extent due to either of the following:

[1] The correlation between our tests and rating by classmates and teachers was higher for the boys than for the girls.

1. The older children are probably more competitive rather than less coöperative. They put forth greater effort to win recognition for themselves. They are thus less inclined to work for their group.

2. The younger children have probably greater inertia and are less able to *vary* their speed and to adjust it on different levels. Other things being equal, the child who is more variable, and whose inertia is lower, will be the one whose speed at self and group work will show the greatest discrepancy. The child whose speed does not oscillate will work for group at a speed equal to that of his self work because of *inability* to adjust his speed on different levels of efficiency.

The fact that the older children were not less coöperative on the Free Choice test which involves an actual conflict between self and group interests seems to support the second hypothesis.

Additional evidence of the increase of oscillation with age is the greater variability (from minute to minute) in the upper grades. The older children were more variable both in work for self and in work for the group. Their curve of self work went *up* and the curve of group work went down more markedly than in the case of the younger children. The correlation between persistence and age was low but positive.

Age-Grade Status

Those children who were neither retarded nor accelerated showed the highest persistence in work. They were least affected by fatigue in work for self as well as in work for the group.

Mental age: There is a low but consistently positive correlation between mental age and coöperativeness. This is particularly marked in the upper grades. There is a similarly low but positive r between persistence and mental age. The r with persistence in group work is definitely higher than the r with persistence in self work.

Intelligence: There is a positive correlation between intelligence and each of the tests of coöperativeness. The relationship between intelligence and efficiency coöperation is curvilinear. Coöperativeness increases with intelligence up to a certain point, beyond which an increase in intelligence is no longer accompanied by an increase in coöperativeness.

There is no correlation between group means of intelligence

and means of coöperation. There is, however, a *negative* correlation between the means of variation of intelligence within the groups and their means in coöperation. Those groups which show less variety of intelligence (low S.D.) are highest in coöperation, while the groups in which there was greatest dispersion of intelligence were lowest in coöperativeness. Coöperativeness within a group probably depends more upon the *homogeneity* of intelligence within it than upon its general *level* of intelligence.

Health: It was shown in Chapter VIII that there is an apparently negative correlation between coöperation on the Efficiency test and condition of health. The following interpretations are offered:

1. There may be some unisolated factors in operation which make the children of poor health a selected group. Those factors may be associated with coöperativeness.

2. Their superiority in the Efficiency test may be due to a high degree of perseveration and inertia or inability to adjust their speed on different levels. This was suggested also as an explanation of the superiority of some younger groups. The older and the healthier children are able to adjust their speed at different levels. The group motive is less attractive to them than the self motive. They respond to it with a slightly lower speed and thus work at a higher speed level when working for self than when working for the group. A high degree of inertia may prevent the younger and weaker children from such adjustment. They are forced to work at an equal speed and thus appear coöperative.

3. Difficulties such as are involved in poor health condition may actually emphasize the need of working together for a given purpose. The weaker or less healthy group has really learned more adequately the need of coöperation.

Population Differences

A. The children of school W ranked highest in coöperation on both the Free Choice and the Efficiency tests. The outstanding characteristics of this school are the following:

1. They were "average" in social status, occupational level, cultural background, age, intelligence, moral knowledge, and emotional stability.

2. They displayed the least variability (greatest homogeneity) in the scores of intelligence.

B. This test was given to an "opportunity" class of a school in Manhattan (control groups at school N). The group was highly selected on the basis of retardation. It was markedly heterogeneous in nature. After the fourth unit of work for class they stopped *en masse*. They went on working for self at top speed but did nothing on their class units. As the examiner offered no encouragement the last class units handed in by the whole classroom were actually blank.

Summary

Problem

To investigate the behavior of children under the motives of competition and coöperation, to measure individual differences on a scale ranging from extreme competitiveness to extreme cooperativeness, and to discover the concomitant factors that are associated with either tendency.

Sources of Data

1. A behavior test devised to measure the responses to competition and coöperation and the relative intensity of each.

2. A number of ratings and scores on objective tests gathered by the Character Education Inquiry.

Description of Test

A. The test material consists of forty pages of simple additions. This material was used to measure speed of work under the following forms of motivation:

1. Practice work.—The children do not write their names on paper. They are told that score will not "count," that they should do the examples just for practice at their usual speed.

2. Competition.—A speed contest is arranged. Children are told that a list will be prepared showing the rank of each child in speed and they are urged to try to attain a high rank. Prizes are promised to those scoring high.

3. Coöperation.—A contest is staged between two parallel classrooms. Children are *not* to write their names but the name of their classrooms on these papers. A prize is promised to the group having the higher total score.

The three sets of papers have one identification symbol. The work for self and the work for group are alternated and each is repeated six times.

B. The scores of coöperativeness:

1. The difference between the two scores of work for self and for group was taken as a score of coöperativeness (Efficiency Coöperation).

2. Children are given the alternative of continuing work either for themselves or for their group. This test is repeated seven times. The number of times a child chose to work for the group was another score of coöperativeness (Choice Coöperation). The two scores are combined into one total score of coöperativeness.

The test was given to 814 children and an additional 724 children were used as control groups. The examinees were of Grades V to VIII in ten schools representing the lower, middle, and upper social levels.

Findings

1. The characteristics of work under competition and co-operation:

a) The efficiency of work under competition was found to be consistently and significantly higher than under coöperation. The average child did 32.4 examples *more* in 12 minutes of work for self than in 12 minutes of work for his group. The ratio of the difference to its S.D. is *13.2*. This difference was found to be larger than the average increase in speed per grade, for Grades V-VIII. In terms of increment above the unmotivated level the group motive was only .45 as potent as the self motive.

b) The difference in speed increased with the progress of work under the two forms of motivation. The curve of self work tends to rise with repetition while the curve of group work drops consistently. Group work shows greater unevenness and less persistence. The correlation between self and group decreases also with the progress of work.

c) As the goal of work, the group was chosen in 26 per cent and self in 74 per cent of the total number of choices. The choices for group decreased with progress of the choice units.

d) A comparison of the curves of work under personal and social motivation revealed the following:

When the two motives are repeatedly alternated the difference

in efficiency increases with the progress of work (the work curves diverge). When the two are given independently their difference decreases with progress of work (the work curves converge).

e) The increase in speed produced by either competition or cooperation disappears with progress of work unless the motive is repeated.

2. The reliability of the two measures of coöperativeness was determined by correlating the differences in the even and odd units of the Efficiency test and by repeating the Choice test and correlating the two sets of scores. The self correlations were .82 and .88, respectively. The two scores of coöperativeness have a low intercorrelation, .23. They evidently test different aspects of coöperativeness, one of working persistently for the group, and the other of choosing to work for the group rather than for self.

3. Validity: The composite rating on general helpfulness by teachers and classmates was used as one criterion. The correlation between our total coöperation score and the criterion was .350 and when corrected for attenuation, .504. Another criterion was a specific rating by a psychologist for a selected group. The *r* was .802. The correlation with a composite of other tests involving helpfulness was .420.

4. Sex Difference: Girls were found to score lower in cooperation involving speed. The difference between self and group work for them was larger than in the case of the boys. They were, however, more coöperative on the test involving choice, choosing to work for the group more often than the boys. The boys showed greater variability, giving either all or none of the work units to their group. The sex group in the majority in a classroom had the higher mean in coöperativeness.

5. The correlation between coöperation and age differs for different populations. In school L (least coöperative population) the *r* is negative. In school W (most coöperative population) the *r* is positive. The difference between populations was larger in the upper grades, VII and VIII, than in the lower grades, V and VI. Those who are neither accelerated nor retarded show greatest persistence in work for self and group.

6. The correlation between intelligence and coöperation was positive, but the relationship was curvilinear. Those of low and those of extremely high intelligence were less coöperative than

those of average intelligence. There is a negative correlation between the group means in coöperation and the respective coefficients of variation of intelligence within those groups. Groups having the highest degree of homogeneity of intelligence had the highest means in coöperativeness.

7. Positive correlations were found between coöperation and the following factors: mental age, intelligence, moral knowledge, resistance to suggestibility, deportment in school, character ratings by teachers and classmates, tests of honesty and inhibition, and neurotic index.

8. Negative correlations were found between coöperation and the following: speed of work, individual variability in speed (oscillation), health history, health condition, vision, condition of teeth, nutrition, socio-economic status, frequency of attendance at movies, and weight-height ratio.

9. Curvilinear relationship was found between coöperation and the number of friends. Those having seven or more friends and those having none were below the average in coöperation. The relation between coöperation and size of family was similarly curvilinear. "Only" children and those having more than four brothers and sisters were less coöperative than the average.

10. Members of Boy Scouts, Girl Scouts, etc., scored somewhat higher in coöperation than their classmates. There were marked differences in coöperativeness between children of different national groups.

11. Siblings resembled each other in coöperativeness, in persistence of work for the group, and in speed of work. Mutual "friends" showed even greater resemblance than siblings.

12. Coöperation with an organized team resulted in even greater efficiency than work for self, while coöperation with an arbitrary group, chosen by the examiner, resulted in lower efficiency than work for the classroom.

13. A series of three lessons with discussion on the significance of coöperativeness resulted in at least a temporary increase in coöperativeness; while the control group accomplished less on the final than on the initial testing.

14. A detailed study was made of the records of 412 children falling in the upper and lower quartiles of the Efficiency cooperation test. The two groups were compared on 66 variables. The coöperative children were rated higher by teachers and

classmates on helpfulness; they scored higher on the Choice Cooperation test; higher on Honesty in School Work test; they were somewhat younger, and more intelligent. The "competitive" children were superior in speed of work; in the Character Education Inquiry Persistence tests; in health history, and in various measures of health condition. The latter group displayed greater variability on most of the records available.

Coöperation with one's classroom (for a group prize) was found less potent as a motive than competition for a personal prize. The efficiency of work in the former case was lower and less persistent than in the latter. There were, however, marked individual differences, ranging from a tendency to be competitive rather than coöperative to one of coöperativeness rather than competitiveness.

Coöperativeness as measured by our tests was found to be associated with other forms of socialized behavior, such as helpfulness, charitableness, honesty, and with ratings by teachers and classmates on the above aspects of behavior. Competitiveness was found associated with higher speed of work and with better conditions of health.

Each of the two tests of coöperativeness had a rather high self correlation, but the two showed a low intercorrelation. Any change in the motive or in the function of the test caused a marked decrease of the correlation. Coöperativeness seems to be specific rather than general in nature.

Educational Implications

The situation of competing for a personal prize has on a whole a greater appeal to children of Grades V to VIII than the situation of competing as a group for a group prize. They will work at a higher efficiency in the former situation and will choose it more often as their goal of work when they can have an opportunity to choose. Children appear to be more *persistent* and less affected by fatigue in their work for a personal gain than when engaged in work on a group project with no personal recognition. In the initial stage of group work the efficiency is as high as that of work for self. With the progress of work, however, the speed of self work was found to increase while that of group work decreased consistently. It seems that the persistence of a motive is

a good measure of its intensity. The fact that children "jump" at a given job is insufficient evidence of interest. The degree of sticking to it is a more adequate measure of its appeal.

Members of a group will tend to show a higher degree of cooperation if there is, within the group, little variation in intelligence, age, and social factors. A maximum of coöperation is obtained when a group is of highest homogeneity. The sectioning of classrooms on the basis of intelligence and other factors would thus augment the cultivation of coöperativeness.

The large differences in coöperativeness from group to group; the relative homogeneity in coöperativeness within each of the groups; the evidence from the correlations with age, and the resemblance among siblings, friends, and partners; and the evidence from the experimental attempt to teach coöperativeness—all lead to the conclusion that coöperativeness as measured by our tests is influenced by environmental factors. It is a habit pattern acquired in accordance with the general laws of learning.

The frequent staging of contests, the constant emphasis upon the making and breaking of records, and the glorification of heroic individual achievement and championship in our present educational system lead toward the acquisition of the habit of competitiveness. The child is trained to look at the members of his group as constant competitors and urged to put forth a maximum effort to excel them. The lack of practice in group activities and community projects in which the child works with his fellows for a common goal precludes the formation of habits of coöperativeness and group loyalty.

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APPENDIX

A. DIRECTIONS FOR THE EFFICIENCY COÖPERATION AND FREE CHOICE TESTS

I

Pass out the tests, serial number down, and say: "Do not touch until I give you directions."

After all have their copies, say: "I will explain this work after we have had two minutes' practice in addition. Do not write your name on this first sheet. It will not count on your score. It is for practice only. When I say 'Go' write the word 'Practice' at the top and begin adding, and work until I tell you to stop. Ready? Go."

After sixty seconds say: "Stop. When I say 'Go' tear off this first sheet and continue adding on the other side. (Demonstrate. Be sure that tearing is in unison.) Ready? Go."

After sixty seconds say: "Stop. Turn this sheet upside down and lay it to one side. You will need it later.

"Now we are going to have two speed contests. One contest is to find out who is the fastest worker in this class; the second fastest, third fastest, and so on to the very slowest. The other contest is to find out which *class* in this school is fastest, second fastest, third fastest, and so on. Each of you has 20 sheets of simple additions. Some of them are for one contest and some for the other. To make it more interesting, you will change on every sheet. On one sheet you will work for a prize for yourself and on the other sheet you will work for a prize for your class. You will write your own name on those papers on which you work for yourself. You will write the words 'Class.....' (fill in) on those sheets on which you work for your class.

"The score of each one will be the number of additions done on all the papers on which you work for yourself and on which you write your names. The score for the class will be the number of additions done on all of the papers which all of you will do for the class. All the papers marked 'Class.....' will be kept separate. A prize will be given those of you making good scores on your own papers, and everyone of you has a chance to win a prize. A class prize will be given the class which is the fastest, that is, the class which gets the most examples done. Your class has a good chance to win this class prize.

"Now turn to the first sheet. You will note that the first addition is 2 + 3. On this sheet you will work for yourself. When I say 'Go' write

your name at the top and begin to add. The faster you work, the higher will be your own score. Ready? Go."

After exactly 60 seconds say: "Stop. Pencils up. When I say 'Go' tear off this first sheet, turn it over, and continue adding for yourself on the other side. Ready? Go."

After 60 seconds say: "Stop. Put this sheet aside, upside down, and turn to the next sheet. On this sheet you will work for your class. When I say 'Go' write the words 'Class.....' at the top and begin adding. The faster you work on this sheet, the higher will be your class score. But everything you do counts. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go,' tear off this sheet, turn it over and continue adding for your class. Ready? Go."

After 60 seconds say: "Stop. Put this sheet to one side, upside down, and turn to the next sheet. On this sheet you will work for yourself again. When I say 'Go' write your name at the top and begin adding. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go,' tear off this sheet and continue adding for yourself on the other side. Ready? Go."

After 60 seconds say: "Stop. Put this sheet to one side, upside down, and turn to the next sheet. On this one you will work for your class prize again. When I say 'Go' write the words 'Class.....' at the top and begin adding. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go' tear off this sheet, and continue adding for your class prize on the other side. Ready? Go."

After 60 seconds say: "Stop. Now put your two class papers together. Be sure your name is not on them. Will the last person in each row please come forward and collect these class papers? *Keep* the papers with your own name on, and the practice sheet. The score for the class is the total number of examples done on these sheets and on the others which you will do for the class later."

(Take class sheets, shuffle them conspicuously, place them to one side and say:) "Now pass the two sheets on which you have placed your own name. Be sure your name is on each paper." Place these in a separate place and say: "Each one's score is the total number of examples he does on his own papers."

II

Say: "Now we are ready to continue these two contests. On the next 8 sheets you will again work on one sheet for yourself and on the other for your class, as before. Just as before, each one's score will be the total number of additions done on all the papers on which you work for yourself and on which you write your name. All the papers marked 'Class' will be put in one bunch. The score of this class will be the total number of additions done on all of these class papers. Don't forget that a prize will be given to those who make good scores on your own papers, and a class prize will be given to the fastest class, that is, the class which gets the most examples done on the papers marked 'Class.'

"Now turn to the first sheet. On this sheet you will work for yourself.

When I say 'Go' write your name at the top and start to add. The faster you work, the higher will be your score. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go' tear off this sheet and continue adding for yourself on the other side. Ready? Go."

After 60 seconds say: "Stop. Put this sheet to one side, upside down, and turn to the next sheet. On this sheet you will work for your class. When I say 'Go' write the words 'Class.....' at the top and start to work. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go' tear off this sheet, turn it over, and continue adding for your class on the other side. Ready? Go."

Same directions on next six sheets, alternately.

III

Say: "There are seven more sheets. You may work on as many of these as you wish for yourself and as many as you wish for your class. You may even do all the papers for yourself, or all for the class. Whatever you do for yourself will count on your own score and whatever you do for your class will add to the class score.

"At the end of the contest I will collect all the papers at one time. Look at the next sheet. Remember, if you write your name on this sheet it will count for yourself, for your own score. If you write the word 'Class.....' on it, it will count for your class. When I say 'Go' write either your name or the words 'Class.....' on the sheet and begin to add. Ready? Go."

After 60 seconds say: "Stop. Put this sheet to one side. We will not use the other side of it. Turn to the next sheet. When I say 'Go' write either the words 'Class.....' or your own name at the top, according as you wish the examples to count for your class or yourself, and begin to work. Ready? Go."

After 60 seconds—as usual.

Give directions like the preceding for the next four sheets, alternating the order in which class and self are referred to.

Then say: "Now we come to the very last sheet of the contest. The score on this sheet will count for more than any sheet so far. The score on this sheet will count for both you and for your class, so put your name at the top and write the words 'Class.....' also. Remember, this is your last chance to make a high score in speed. Work as fast as ever you can. Ready? Go."

After 60 seconds say: "Stop. When I say 'Go' turn over the sheet and continue working as rapidly as possible. This is your very last minute of work. Ready? Go."

After 60 seconds say: "Stop. Lay this sheet aside. Now find your practice sheet. You may add this sheet either to your score or to the score of your class. If you want it for yourself, put your name on it. If you want it for the class, write the words 'Class.....' on the sheet."

Allow time; then have papers collected.

B. TEST MATERIAL

Sample sheet of the 40-page booklet used in the Efficiency and Free Choice tests. Note the identification symbol at the bottom of the page (46-20). The examples were used either as simple additions or additions—subtractions—multiplications. Sixty thousand of these sheets were used in this research.

Score.....

Do each example as you come to it, moving across the page from left to right.

6	9	7	5	7	2	3	4	2	5
8	2	9	8	6	6	5	3	8	9
—	—	—	—	—	—	—	—	—	—
4	6	4	9	3	3	7	2	6	6
2	8	9	8	6	7	5	3	9	5
—	—	—	—	—	—	—	—	—	—
3	8	8	5	2	8	7	6	7	6
9	4	7	7	5	3	4	5	3	9
—	—	—	—	—	—	—	—	—	—
4	8	7	7	8	3	2	5	9	6
3	5	2	8	6	8	4	3	7	4
—	—	—	—	—	—	—	—	—	—
6	8	3	5	2	7	8	5	9	7
3	9	2	4	6	9	4	2	3	5
—	—	—	—	—	—	—	—	—	—
2	6	8	9	4	9	2	4	6	5
7	7	2	2	6	4	9	8	2	8
—	—	—	—	—	—	—	—	—	—
6	9	3	2	4	5	2	9	4	8
7	5	5	8	3	9	4	2	9	9
—	—	—	—	—	—	—	—	—	—
7	3	5	8	6	5	4	4	7	8
3	6	7	5	9	6	3	5	8	6
—	—	—	—	—	—	—	—	—	—
2	3	6	3	5	4	6	9	8	7
5	8	4	9	3	2	3	6	7	2
—	—	—	—	—	—	—	—	—	—
2	9	4	7	6	7	4	7	9	5
3	7	7	3	5	4	8	2	4	7
—	—	—	—	—	—	—	—	—	—

46–20

VITA

Julius B. Maller was born April 15, 1901, in Wobolniki, Lithuania. His elementary education was autodidactic. He graduated from the Talmudic Academy (Yeshivah) of Telshi in 1917, and from a German Teachers Training School at Kovno in 1919. He came to the United States in 1921 and took the B.A. degree (1925) at Washington University, and the M.A. degree (1926) at Teachers College, Columbia University, where he held a fellowship in education given by the Union of American Hebrew Congregations. In 1927 he received the degree of D.H.L. (Doctor of Hebrew Literature) from the Jewish Theological Seminary of America.

He has been lecturer at the H. U. C. School for Teachers since 1926. In 1928 he was appointed Research Assistant in the Division of Educational Psychology, Institute of Educational Research, Teachers College, as a member of the staff of the Character Education Inquiry. He is co-author of *Studies in Service* and *Studies in Self-Control* (Macmillan 1929).